NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 4, NUMBER 3 JANUARY 19, 1987

▶ COMPANYWIDE COMMUNICATIONS

HP readies powerhouse X.25 network package

Four 'solutions,' 13 products set to bow.

BY BOB WALLACE
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. is gearing up to announce a raft of network equipment next month, in what the company is billing as the most comprehensive networking announcement in its history, *Network World* has learned.

HP is scheduled to introduce 13 new products on Feb. 23 that are intended to address four application-specific network environments, including sales and service, business offices, manufacturing and engineering. The heart of the announcement will be X.25-based products that customers can use to build wide-area, private, packet-switched networks.

When combined with existing networking equipment, including Ethernet-type local networks, the products will enable HP to provide companywide data communications systems.

The products are the result of the realignment of HP AdvanceNet, the company's network architec-

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▶ WATCHDOG GROUP

Users' ad hoc advocate

Ad Hoc Committee leads the good fight.

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C. — In 1979, the Federal Communications Commission began proceedings to eliminate WATS. The FCC ruled that WATS and Message Toll Service were virtually identical but priced differently, a violation of the Federal Communications Act of 1934.

An appeals court overruled the FCC in 1981, due in large part to a legal campaign waged by the Ad Hoc Telecommunications Users Committee. The group, made up of 20 of the largest companies in the nation, is one of the oldest user organizations in the U.S.

The organization sprang up in the early 1960s with about a half-

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Comparison of building wiring systems

	Northern Telecom's IBDN	IBM's Cabling System	AT&T's PDS	DEC's DECconnect
Cable type:	3 or 4 nonshielded twisted-pair 62.5/125 micron fiber*	2 shielded twisted-pair, 4 nonshielded 100/140 micron fiber*	2 4-pair nonshielded twisted-wire 62.5/125 micron fiber*	2 4-pair nonshielded twisted-wire
Outlet type:	1 telephone-type modular jack	1 telephone-type modular jack, 1 IBM data jack	2 telephone-type modular jacks	2 telephone-type modular jacks, 2 coax jacks
Multivendor support:	✓		✓	✓
RS 232-RS 423-compatible	Both	Neither	RS-232	Both

* Fiber/cladding diameter

SOURCE: INFORMATION TRANSPORT SYSTEMS, INC., NEEDHAM, MASS.

▶ NORTHERN TELECOM

NTI sports new wiring scheme

BY BOB WALLACE
Senior Editor

NASHVILLE — The cable wars heated up last week with Northern Telecom, Inc.'s introduction of a twisted-pair/fiber-optic building wiring scheme that will compete against similar systems offered by IBM, AT&T and Digital Equipment Corp.

The switch maker said the Integrated Building Distribution Network (IBDN) is designed to support the company's own SL-1 and SL-100 private branch exchanges, as well as PBXs from other major vendors, including AT&T, Mitel Corp. and Rolm Corp. Data equipment supported includes systems from IBM and Wang Laboratories, Inc.

Like competing cabling products, IBDN specifies the materials used and the manner in which buildings can be wired to provide office outlets capable of supporting individual voice and data connections.

Unified wiring systems reduce the cost and complexity of installing or moving voice and data equipment by eliminating the need to pull cable when terminals are relocated.

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NETWORK LINE

News

Cutbacks at Wang Laboratories may force the company to consolidate the manufacturing and sales operations of PBX-maker Intecom with Wang's own. Page 2.

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Long-distance resellers and their customers are squeezed by the Jan. 1 abolition of a special WATS credit provision formerly offered by AT&T. Page 2.

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If AT&T's proposed Accunet T1.5 rate reductions take effect next month, some users may abandon other private-line offerings to take advantage of the high-capacity transmission medium. Page 2.

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US West's decision to bail out of BELLCORE illustrates the RBHCs' growing demand for proprietary research and may lead to significant changes for the giant research and engineering consortium. Page 4.

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US Sprint responds to recent AT&T tariff reductions with reduced business and residential rates and a new virtual banded WATS service. Page 5.

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Many manufacturing users are still hesitant about employing MAP/TOP-based networks and are hoping MAP pioneers will show them the path to multivendor networking. Page 6.

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Multivendor teleports combining voice-grade circuits, satellite uplinks and fiber optics are touted as shopping malls for communications needs. Page 35.

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NEWSPAPER

FEATURE FOCUS

Mux multitude muddles managers

Timing troubles plague some T-1 drop-and-insert nets.

BY JOHN J. HUNTER
Contributing Writer

Selecting a T-1 multiplexer used to be easy. But today, communications managers must consider voice and data interaction as well as carrier and networking problems before making their choices. Being aware of caveats in T-1 operation can help keep users out of the multiplexer quicksand.

Currently, there are more than 30 T-1 multiplexers from which to choose. With transmission facilities as a criterion, T-1 multiplexers are segmented into three categories: basic point to point, drop and insert, and

☞ See **T-1** page 30

▶ SHAKEOUT?

Death of WATS subsidy threatens reseller camp

Plummeting profits undermine business.

BY BOB WALLACE
Senior Editor

The Jan. 1 termination of a special AT&T WATS credit provision has jeopardized the future of long-distance services resellers and forced them to seek refuge with discount common carriers.

Industry analysts say the end of the special WATS provision, combined with large rate cuts by major carriers, has decreased resellers' profit margins and made their future look bleak. That turmoil in the reseller market will likely translate into higher service costs for users and a smaller number of resellers to choose from.

"We anticipate an enormous shakeout in the reseller industry over the next year to 18 months," said Gerald Mayfield, president of the Professional Services Division of the Stamford, Conn.-based DMW Group, Inc., a communications research and consulting company. The reseller shakeout will specifically affect medium and smaller users, because large users rely primarily on large carriers such as AT&T, MCI Communications Corp. and US Sprint Communications Co., according to Mayfield.

Resellers are firms that buy bulk long-distance services at below-retail prices and resell these services primarily to medium and small users.

Before the Business Line Pro Rate was initiated in 1984, both AT&T and resellers were charged for the local portion of WATS lines. Under the special provision, however, resellers could recoup the cost of local-access lines through a credit provided by AT&T.

Removal of the Business Line Pro Rate will squeeze the already narrow profit margins of struggling resellers by increasing their cost of doing business. Victor Toth, an attorney specializing in telecommunications issues, explained that switching to lower cost services of-

See **Reseller** page 41

▶ PRIVATE LINES

FCC OK on Accunet rate would slash T-1 charges

BY MICHAEL FAHEY
Staff Writer

If AT&T's new Accunet T1.5 tariff takes effect next month as planned, substantial reductions in the cost of T-1 circuits over 100 miles may encourage users to desert other private-line offerings in favor of the high-capacity transmission medium.

AT&T's proposed T-1 price cuts, which call for hefty rate reductions for T-1 circuits over 100 miles long, were slated to go into effect in December but were deferred by the Federal Communications Commission until Jan. 22. The FCC later deferred implementation of the new rates a second time — they are now slated to take effect Feb. 5 — pending additional information from AT&T.

AT&T's proposed Accunet T1.5 tariff calls for a fixed monthly charge of $2,600 and a $15.50 per mile monthly charge. Under the existing tariff, fixed monthly fees fall into one of three mileage categories, increasing with circuit length, and monthly mileage charges decrease with hours of use.

The new tariff will lessen Accunet T1.5 rates for circuits of roughly 100 or more miles and increase the cost of shorter links.

If approved, the AT&T filing will drop the monthly price of a 1,000 mile AT&T T-1 circuit roughly 35%, from $28,296 to $18,100. Users who opt for 3-year service leases will receive a 4% discount, which would drop the cost of that circuit to $17,500. With a 5-year lease, the discount would be 8%, and the circuit would cost $16,850 per month.

Rates for links of 500 miles dropped more dramatically in the proposed tariffs. A 500-mile AT&T T-1 circuit that costs $14,871 per month under the current tariff will drop more than 30% to $10,350. Users who opt for a 5-year agreement and 8% discount would pay a monthly charge of $9,725.

These rates pertain to the inter-office portion of AT&T's service. Users must pay additional monthly fees for the local exchange carrier

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▶ INTECOM

Wang eyes integration

Profits go south; Intecom coming north?

BY JIM BROWN
New Products Editor

LOWELL, Mass. — Strained by mounting losses, Wang Laboratories, Inc. may merge the manufacturing facilities of subsidiary Intecom, Inc. with its own and deploy Intecom sales representatives in Wang district sales offices, company President Frederick Wang said last week.

Frederick Wang, recently named president and treasurer of the firm founded by his father, An Wang, spoke of the company's plans for private branch exchange maker Intecom in an interview with *Network World*, following the introduction of Wang's VS 7000 series of minicomputers here. At the product unveiling, the company also hinted at the release later this year of a Resource Sharing Facility capable of connecting up to four VS systems in a cluster arrangement.

The Resource Sharing Facility is reportedly a stand-alone cabinet with processor boards and software designed to connect users attached to one VS system to data or programs residing on any of three other systems. The product is currently being used in a U.S. Air Force installation, and Wang engineers are readying a commercial version for introduction this year.

During the interview, Wang spoke of plans to move at least a portion of Intecom's Allen, Texas-based manufacturing operations to Lowell, Mass. He also said that Intecom and Wang sales staffs will be housed in one office in markets where each company has a separate office now. Wang also said product development efforts will be stepped up in an attempt to improve Intecom's presence in the under-800-line PBX market. Intecom's research and development staff will remain in Texas, Wang said.

Intecom President John Thibault last week also spoke of pending changes in the company's manufacturing operations. "We will always have some manufacturing here in Texas," Thibault said. However, he added, Intecom will use Wang's facilities to manufacture high-vol-

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Correction:

The product review on private Digital Access and Cross-connect (DACS) ("Private DACS: A new breed of switch offers more control," *NW*, Jan. 5) mistakenly identified it as a service of AT&T Network Systems Group.

According to AT&T, DACS is a piece of equipment made by AT&T Network Systems Group, but part of AT&T's net. The capability described in the article is called Customer Controlled Reconfiguration and is a function of AT&T's Accunet T1.5 service.

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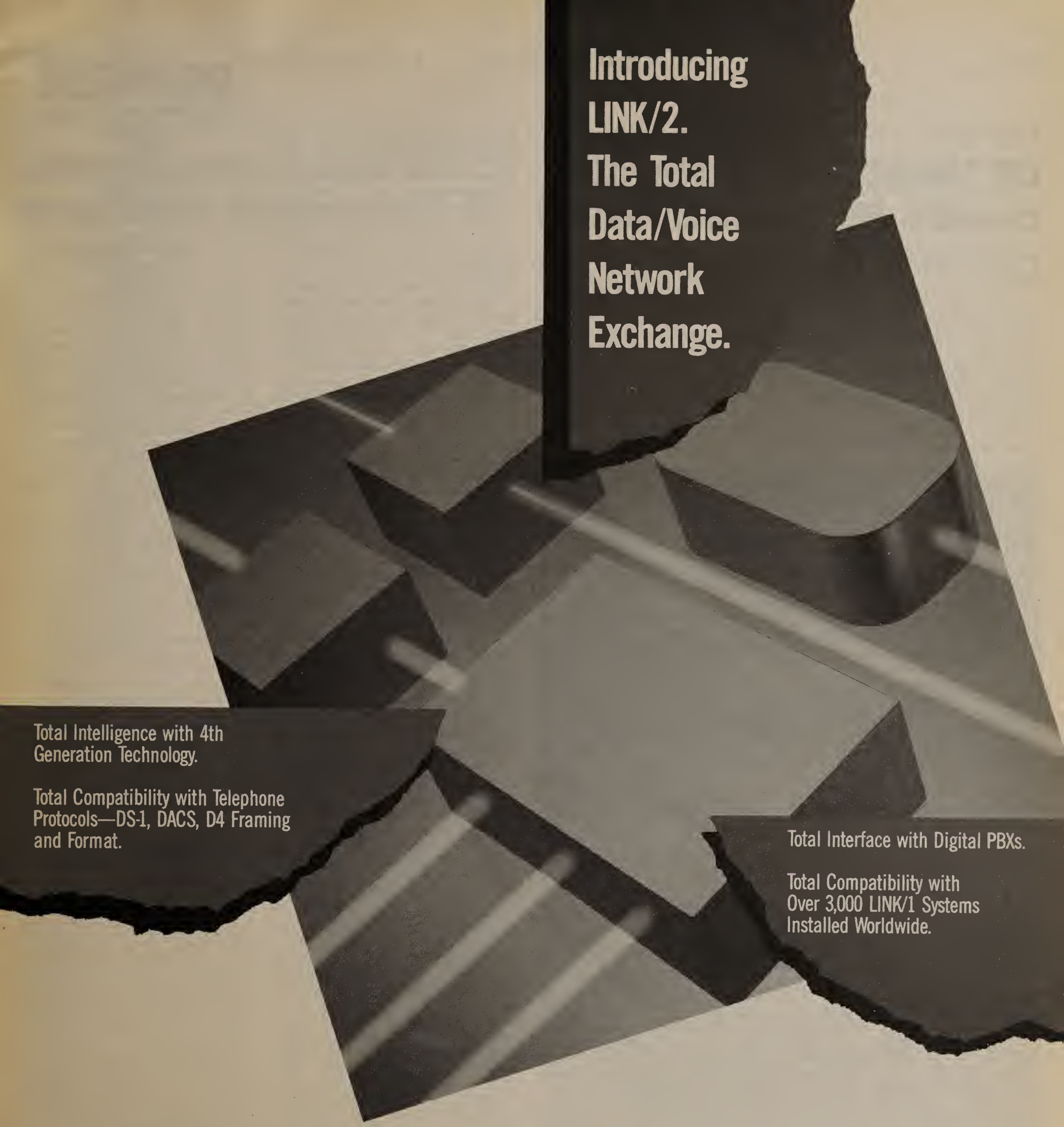

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▶ BOC R&D

US West's withdrawal clouds BELLCORE future

BY PAM POWERS
Senior Editor

LIVINGSTON, N.J. — US West, Inc.'s intention to withdraw from Bell Communications Research, Inc. (BELLCORE) in 1990 has raised questions about the future of the giant research and engineering consortium owned by the regional Bell holding companies.

BELLCORE's shared research efforts have been imperiled by increasing competition among the RBHCs. US West cited the growing importance of proprietary research projects in its decision. The company's withdrawal may spell trouble for BELLCORE, according to analysts who believe other RBHCs may follow the company's lead.

"I don't see how BELLCORE can survive in the competitive environment. It isn't allowed to do any of the things that would be useful to the RBHCs," said Ian Angus, president of Angus TeleManagement Group, Inc., a Toronto-based consulting firm.

Jean Graham, industry analyst with Dataquest, Inc., a San Jose, Calif.-based research firm, said, "All of the RBHCs have the resources to establish their own labs and produce their own proprietary research."

US West wanted out for precisely that reason, said Doane Perry, senior analyst with International Data Corp. in Framingham, Mass. "The telco has its own mini-BELLCORE, an R&D arm called Tri-Co."

At least one other company is voicing concerns similar to US West's. "I think the issues US West raises are good ones," said David Smith, staff manager of business planning with Pacific Bell. "We share US West's concern."

If the trend is toward proprietary research, BELLCORE may have to be disbanded or at least repositioned in terms of services offered. "Perhaps some time during this 3-year period, BELLCORE will reorganize to incorporate proprietary research," Graham said.

BELLCORE is already examining that possibility. A BELLCORE spokesman said a special task force convened in November to study the organization's relationship with the RBHCs and will recommend changes to the board of directors.

"Our role is changing," he said. "It is always under scrutiny."

The spokesman would not explain how BELLCORE's role could change. In fact, top officials of both companies declined to speak about US West's action last week.

US West announced its plan to withdraw from BELLCORE in a pre-Christmas letter to the head of the consortium. US West said it was exploring the option of selling its shares in BELLCORE in 1990.

Under the terms of the agreement, the RBHCs must give BELLCORE at least three years' notice before withdrawing from the consortium.

While US West officials would not discuss details of the letter, a spokesman said that BELLCORE should "provide services that match the competitive individual needs of the operating companies."

The BELLCORE spokesman said all seven regionals recently sent a letter expressing their support for BELLCORE and satisfaction with the consortium's research work.

At its inception in 1984, BELLCORE's charter called for the operating companies to share the costs of a common research and engineering organization. Since that time, BELLCORE has undertaken research in areas such as network architectures, standards and software technology for use by all the regionals. But as the Baby Bells expand their businesses, they are more frequently pitted against each other. "BELLCORE had better get in sync with the new competitive environment," Perry said. "Its charter no longer fits with the strategy of the RBHCs."

Spokesmen from BellSouth Corp., Pacific Telesis Group and others say they do not intend to withdraw from the consortium. ◪

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▶ REGULATION REVIEW

Report says freed BOCs may slice trade deficit

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Department of Commerce's National Telecommunications and Information Administration (NTIA) will release a report this month that is expected to endorse a partial lifting of the Bell operating company line-of-business restrictions in an effort to reduce the U.S. trade deficit.

"The report poses the question of what would happen to the U.S. trade deficit if the line-of-business restrictions were lifted and the BOCs were allowed to get into new areas of business," said Kenneth Robinson, policy advisor at NTIA.

> *"Everyone is trying to get on the trade deficit bandwagon."*

The report's apparent conclusion is that permitting the BOCs to offer information services and manufacture telecommunications equipment will improve the U.S.'s international trade position. It is unlikely the NTIA will find any trade benefit in allowing the BOCs into the long-distance market.

The NTIA report will coincide with the release of the U.S. Department of Justice's triennial review of the Modified Final Judgment that resulted in the divestiture of AT&T. That review will be submitted to U.S. District Court Judge Harold Greene and released to the public by the end of this month, according to Barry Grossman, communications and finance section chief of the Antitrust Division of the Justice Department.

The Justice report explores the possibility of lessening Modified Final Judgment restrictions regarding the divested BOCs in light of antitrust considerations. It is based in part on a year-long study of competition in the various submarkets of the telecommunications industry conducted last year by the Department of Justice's special consultant, Peter Huber.

The Justice report will assess the extent of competition in the information services, manufacturing and interexchange sectors of the industry to determine if the Baby Bells should be allowed to participate in these markets. These lines of business have been off-limits to the BOCs since the divestiture of AT&T.

The NTIA report is expected to complement the Justice Department's report and focus on international telecommunications trade issues in which the NTIA specializes. The Department of Justice will concern itself with antitrust and monopoly issues. The two reports are expected to come to similar conclusions regarding lessening of BOC business restrictions.

The Justice report is expected to suggest to Judge Greene that the BOCs be allowed to offer information services and manufacture telecommunications equipment with some stipulations.

According to some Washington observers, the NTIA report is not expected to be a conclusive study on the telecommunications trade issue. NTIA contacted the BOCs for information relating to this study but ignored other industry representatives. Several industry associations said they were not contacted for input. Robinson said the NTIA did not solicit public comment.

Everyone is trying to get on the trade deficit bandwagon, and the NTIA report is just one of many such projects we'll be seeing this year, explained George Dellinger, of the Washington Analysis Corp. ☑

US Sprint cuts rates

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — US Sprint Communications Co. last week responded to AT&T's rate reductions by filing new interstate tariffs with the Federal Communications Commission that cut business rates 13% and residential rates by 9%. The carrier also introduced a new virtual banded WATS service to compete with AT&T's Pro America III service.

US Sprint officials would not comment on either the dollar value of the rate reductions or the total overall percentage of the reduction. The new tariffs are US Sprint's reaction to AT&T's $1.85 billion rate cut, which took effect Jan. 1. US Sprint's rates are scheduled to take effect March 1, pending FCC approval.

In its reductions, AT&T lowered daytime charges by 14.5%, WATS and 800 by 4.6%, evening rates by 9.3% and weekend rates by 5.9%. US Sprint refused to elaborate on the rate cuts on a service-by-service basis. "Our customers and product mix are so different from AT&T's that it doesn't make sense to compare our rates," said US Sprint spokesman Michael Furtney.

US Sprint claimed it offers price savings from 5% to 33% compared with AT&T rates. While US Sprint has managed to maintain a price advantage over AT&T, the spread between the two long-distance carriers continues to narrow. "There's no doubt that gap is narrowing between our rates and AT&T's," Furtney said. "But our objective is to be competitive. We still have a price advantage over AT&T, while continuing to improve the quality of our service," he said.

In addition to cutting rates last week, US Sprint restructured all of its tariffs, eliminating one of the four volume discount rate steps.

The new WATS tariff has three rate steps: $20 to $99.99 per line per month; $100 to $199.99; and $200 to $999.99. The company eliminated the upper level step of $1,000 and up. As a result, customers will be encouraged to migrate to the new virtual banded WATS service called Advanced WATS Plus, which is comparable to AT&T's Pro America III service.

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▶ PROTOCOL PIONEERS

Users skeptical of MAP

Lack of early results hampers growth.

BY MARY PETROSKY
West Coast Correspondent

PHOENIX — While Manufacturing Automation Protocol pioneers are contemplating migration from Version 2.1 to 3.0 of the standard, many users at last week's MAP/TOP Users Group Meeting said they are still trying to determine just what MAP can do for them.

Some early MAP users are reluctant to talk about their experiences with the factory communications specification, which was designed to enable factory floor equipment from different vendors to communicate over a single network.

The lack of concrete cost/benefit information on current MAP installations is making it hard for non-MAP users to justify investment in the technology. Recognizing this problem, the MAP/TOP Users Group is forming a special interest group to disseminate information about early user experiences.

Spokesmen for Hewlett-Packard Co. and Honeywell, Inc. sounded a positive note for interoperability by announcing that Proctor & Gamble Co. had successfully transferred files between the two companies' equipment using MAP's File Transfer, Access and Management application-layer protocol.

Also, Industrial Networking, Inc. (INI) used the meeting to launch a software development product aimed at solving the problem of linking applications programs to the MAP protocols. INI's MAP/One Application Services (MAS) host-resident software provides a set of interfaces that link applications to the seven International Standards Organization protocol layers within INI's board-level network interfaces.

MAS supports both MAP 2.1/2.2 protocols and the Manufacturing Message Service, an event management protocol specified in MAP 3.0. INI's Event Manager allows users to define and await events on the network and will provide signals when predefined events occur. INI's interface essentially isolates users from future MAP changes, said Michael Gardner, INI's vice-president of marketing. MAS is available for the IBM PC-DOS Release 3.2, Digital Equipment Corp. MicroVMS Version 4.3 and DEC VMS Version 4.4 environments.

Current MAP users acknowledge that software development represents a major factor in the overall cost of a MAP installation. In IBM's pilot MAP project, the applications development accounted for nearly 60% of the project's cost, according to Rick Sheftic, project leader. By contrast, the broadband network accounted for about 10% of the total cost.

Sheftic said the MAP network at IBM's Endicott, N.Y., plant is now out of the pilot stages and into production use. One benefit of the MAP network, Sheftic said, was that IBM was able to run multiple logical networks on the same cable.

Despite MAP's promise, many users are still hesitant to commit to the technology because the current 2.1 version of the specification is not fully compatible with Version 3.0, due to be released at the end of April. Many users believe they would be better off waiting for products based on MAP 3.0.

"I think a lot of people, if they haven't already started purchasing MAP equipment, are going to wait," said Terry Yoder, member of the technical staff of the Computer Aided Engineering Laboratory at Rockwell International Corp. in Anaheim, Calif. As a military contractor producing small quantities of specialized electronics equipment, this division of Rockwell isn't sure what benefits MAP might provide, Yoder said.

MAP's complexity is also intimidating a number of potential users, many of whom have no experience with broadband networks. Dale Brown, manager of Communications and Computer Management for Ford Aerospace & Communications Corp.'s Air and Electronics Division, said he does not have the communications technicians needed to operate and maintain a broadband network. Because such technicians are in high demand, they are commanding hefty salaries, which poses a problem for defense contractors with increasingly tight budgets.

Although there are data collection terminals on the factory floor at the Newport Beach, Calif., plant, Brown said there is no real network in place yet.

"We really have to wait for applications to surface," Brown said. "We have to be careful not to buy technology for technology's sake."

Current MAP users agreed that MAP should be looked at as a vehicle to deliver applications.

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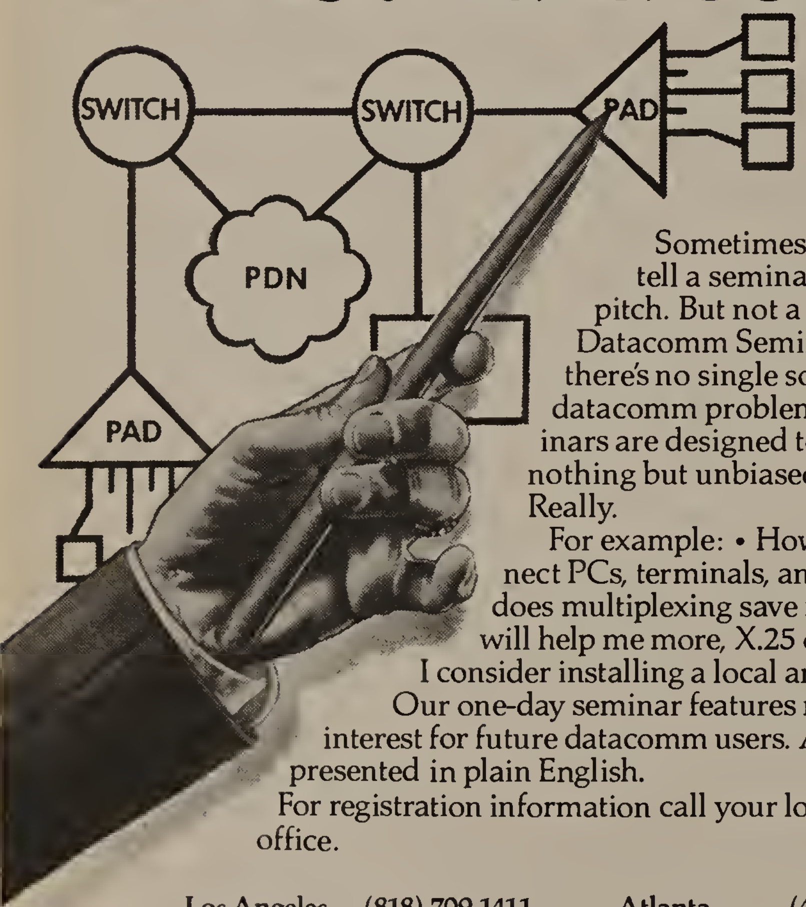

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Houston, TX
February 10
Indianapolis, IN
January 14
Kansas City, MO
January 14
Long Beach, CA
January 14
Louisville, KY
January 21
New York City, NY
January 21
February 25
Orlando, FL
January 29
Pittsburg, PA
March 3
Portland, OR
April 8
Sacramento, CA
March 19
San Diego, CA
February 11
San Jose, CA
January 21
Seattle, WA
February 18
Spokane, WA
May 20
St. Louis, MO
February 25
Tulsa, OK
February 19
Walnut Creek, CA
May 13
Washington, DC
January 15

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IBDN from **page 1**

IBDN specifies use of three or four pairs of nonshielded telephone-type wire, or fiber-optic cable, in the horizontal cable runs between central wire closets and individual offices. High-rise buildings typically have wiring closets on each floor. Twisted-pair wire or fiber is also specified for use in building risers, the vertical shafts used to interconnect wire closets on different floors.

The office outlet, the interface through which terminals connect to IBDN, specifies the use of separate modular telephone-type jacks for voice and data devices. For applications supporting clusters of terminals, multiple 3- or 4-pair cables can be routed to one location.

Twisted-pair wire in IBDN can support Northern Telecom Meridian SL-1 2.56M bit/sec links up to a maximum distance of 2,000 feet.

The switch maker claims a combination of twisted-pair wiring and baluns can be used to accommodate systems such as IBM System 370 mainframes at 2.35M bit/sec, and IBM System/34, 36 and 38 minicomputers at 2.4M bit/sec. It will also support Wang's VS/OIS at 4.2M bit/sec. Fiber-optic cable can be used to support Ethernet systems operating at 10M bit/sec.

Jerry Eisen, president of the Iselin, N.J.-based Office Sciences International, a consulting firm specializing in wire and cable systems, said Northern Telecom's IBDN will prove less expensive than uniform cabling systems peddled by competitors.

"IBDN will be less expensive because it requires only a single outlet," he explained. AT&T's Premise Distribution System (PDS) and the IBM Cabling System call for two-jack outlets. DEC's DECconnect specifies a four-jack outlet.

But Eisen warned that uniform wiring systems employing nonshielded twisted-pair wire are sensitive to interference. "There are many interference problems inherent to cabling systems that use nonshielded twisted-pair copper wire," he said. Only IBM's Cabling System makes allowances for use of shielded, twisted-pair wire. Although this type of wire is bulky and more expensive than other alternatives, it reduces interference problems, Eisen said.

Gerald Culbert, president of Information Transport Systems, Inc. — a Needham, Mass., cable installation firm — and a former division manager for AT&T's PDS, claimed IBDN is similar to PDS, a wiring plan that also uses twisted-pair wire and lightwave cable.

"In all appearances, IBDN is a mirror image of AT&T's PDS," Culbert stated.

Both cabling systems standardize on the same type of fiber-optic cable. Both IBDN and PDS specify use of fiber with a fiber diameter of 62.5 microns and an outside cladding diameter of 125 microns. The IBM Cabling System calls for 100/140-micron fiber-optic cable. ☑

▶COMSAT

Service to Europe and Asia begins

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C.— Comsat International Communications, Inc. last week announced it has begun offering all-digital satellite transmission service between three U.S. West Coast earth stations and Europe and East Asia. Comsat International also announced a discount plan for users signing long-term contracts.

Two of the West Coast earth stations are located in San Francisco at the Bay Area Teleport, and one is located in Santa Paula, Calif., near Los Angeles.

According to a Comsat International spokeswoman, the new facilities will provide businesses and government agencies on the West Coast with improved international communications services. Comsat International said users signing a 1-year contract for service provided through the company's new West Coast earth stations will receive a 10% discount. Users signing up for two years of service through the West Coast facilities will receive a 12% discount.

In addition to its West Coast facilities, the company operates earth stations in New York and Washington, D.C., and plans to begin service in the Chicago and Houston areas. Comsat did not say when the Chicago and Houston earth stations will go into operation. Customers contracting for service through these earth stations will receive an 8% discount for a 1-year commitment, and a 10% price cut for a 2-year contract.

To qualify for Comsat's discount program, contracts must be negotiated by the end of March and service must begin by Sept. 30. The discounts also include free installation for Comsat International's alternate voice/data and simultaneous voice/data offerings, 56K, 64K and 128K bit/sec. ☑

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Ad Hoc from **page 1**

dozen members, according to attorney James Blaszak, legal counsel for the Ad Hoc Committee. It became especially active in legal and regulatory affairs when the telecommunications environment heated up in the late 1970s.

Like the International Communications Assocation (ICA) and the Tele-Communications Association (TCA), the Ad Hoc Committee's role is to represent the interests of telecommunications users in the courts, and before the FCC and other regulatory bodies, according to Chairman William Pomeroy, manager of telecommunications public policy for General Electric Co.

But "organizations such as ICA and TCA are much more broadly based," Pomeroy said. "The ICA has 600 member companies that range in size from relatively small to very large. The member companies of Ad Hoc are very large and their needs are much more focused than the broad spectrum of companies that are members of ICA."

Pomeroy said the ICA and the Ad Hoc Committee complement each other and often take up the same issues on behalf of users.

Among the companies the Ad Hoc Committee represents are Martin Marietta Corp., E.I. Du Pont de Nemours & Co., The Travelers Corp., Electronic Data Systems Corp., GE, American Express Co., Sears, Roebuck & Co. and Ford Motor Co.

Blaszak, a partner in the law firm of Heron, Burchett, Ruckert & Rothwell, based here, said one of the committee's strengths is the direct involvement of users with operational responsibility for their companies' telecommunications services.

"It is important for us to hear from the real managers," Blaszak said. "There would be no value in the committee if its work didn't relate back directly to the interests and concerns of the member companies. That means we can't let the committee's work become sterile and academic."

Blaszak cited the Ad Hoc Committee's efforts to have carriers adopt cost-based pricing rather than strategic pricing as the kind of issue the group champions.

"That issue has a clear connection to members' interests," Blaszak said. "It is very clear that this has a direct impact on the costs the members pay for private lines, for example, and thus, a clear impact on the configuration of their networks."

Other equally important isssues, Blaszak said, often do not appear critical at first. For example, the issue of how non-traffic-sensitive telecommunications costs are collected.

The Ad Hoc Committee took a strong and consistent stand, saying that those costs should be collected from the end user to the maximum extent possible, Blaszak said.

"That led to the implementation of subscriber line charges, the direct assignment of WATS access-line costs and prevention of a method that would have recovered non-traffic-sensitive costs on a usage-sensitive basis from private-line users."

Page Montgomery, vice-president of Economics and Technology, Inc. (ETI), said the committee plays an important role for the industry as a whole by representing views of large and innovative users before the FCC and other regulatory bodies.

"The American economy and the telecommunications industry are better off if corporations that have their own telecommunications professionals and their own networks are allowed to continue to tailor those networks to meet their needs," Montgomery said. "The Ad Hoc Committee does an excellent job of representing those users." According to Montgomery, the Ad Hoc Committee has championed tariff and policy provisions that allow large users to maintain innovative communications networks.

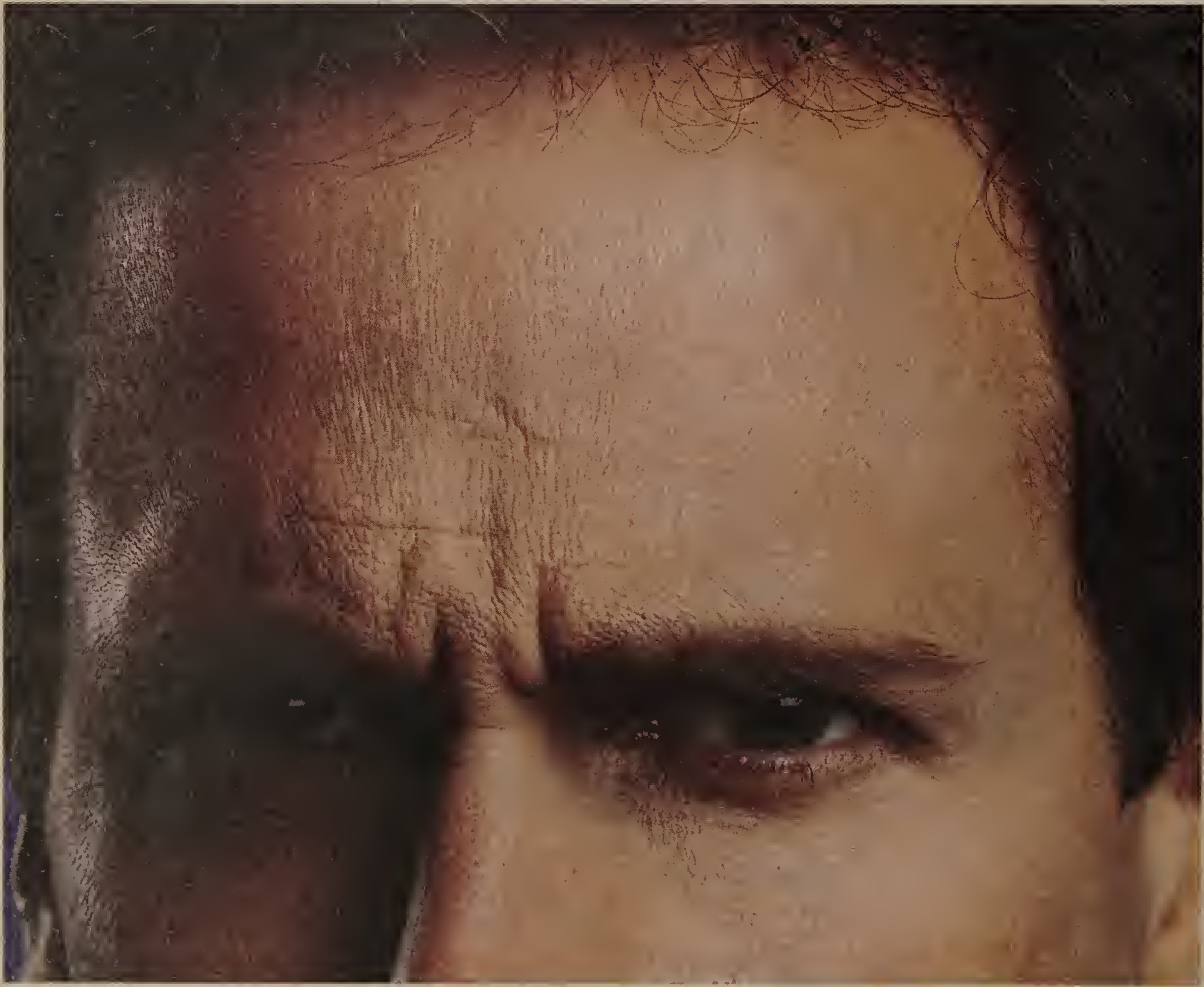
Pomeroy, who has served as chairman of the Ad Hoc Committee for six years, said the group primarily represents the interests of large users but is diverse in that it is made up of companies from many industries.

"The committee represents a good cross section of American industry," Pomeroy said. "It isn't all banking or aerospace. The interests of Bethlehem Steel are not the same as Proctor & Gamble, and the interests of Westinghouse are different from those of J.C. Penney. But we can formulate an argument that represents the mainstream of business in the U.S."

Pomeroy declined to reveal the Ad Hoc Committee's annual budget but said it is well into six digits. Member companies can elect not to participate in particular filings or issues.

In such cases, the member company's name is not associated with the committee's action and the member company is not assessed expenses specifically associated with the action.

"The importance of the Ad Hoc Committee is that it not only adds another voice to the users' interest, but it adds a very professional voice," said Brian Moir, legal counsel for the ICA. "Their information is well thought out and gives us all a mark to strive for." ◻



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INDUSTRY UPDATE

Dictaphone wins M/A-Com VSAT contract

M/A-Com Telecommunications Corp. awarded Dictaphone Corp. an exclusive third-party maintenance contract for M/A-Com very small aperture terminal satellite equipment. Dictaphone is a Pitney Bowes, Inc.-owned manufacturer of voice processing systems.

Third-party maintenance market

Top five vendors	1986
TRW, Inc.	**$267m**
Sorbus, Inc.	**$255m**
General Electric Co./RCA Global Communications, Inc.	**$170m**
Intelogic Trace, Inc.	**$152m**
Control Data Corp.	**$133m**

Total market $1.56 billion

SOURCE: INPUT, MOUNTAIN VIEW, CALIF

INDUSTRY EYE

PETE NELSON

PADs contribute to network solutions in multivendor mix

Recent improvements in packet assembler/disassembler (PAD) products allow for better support of mixed vendor environments and multiple applications in a more cost-effective and convenient manner than in the past.

Users tackling issues of cost, control, reliability, flexibility, and adherence to Open Systems Interconnect/X.25 and IBM Systems Network Architecture standards will find some pleasant solutions with the use of today's PADs.

Protocol support

Today's data processing environments have a wide mix of vendor equipment and user applications.

Organizations have personal computers, workstations, minicomputers and mainframes from a variety of vendors. Common protocols include asynchronous, Binary Synchronous Communications (BSC), SNA/Synchronous Data Link Control (SDLC), X780 and 3270.

Fitting the DP end with communications and protocol equipment can be expensive and complicated. But PADs can provide simple "plug-in" access to the network. As a result, open multivendor architectures become more economical. This, in turn, encourages the common corporate backbone strategy, which can offer major operational and cost efficiencies.

By supporting IBM protocols, notably BSC and SNA/SDLC, PADs allow one network to serve, and load-share, multiple SNA environments concurrent with non-SNA applications.

Multiprotocol PADs increase network flexibility while containing costs and are ideal for organizations with many types of hosts. Because fewer access lines are needed between PADs and backbones, users need fewer lines to connect multiple devices or access multiple hosts. Such a PAD might, for example, provide access for SDLC, BSC and asynchronous users.

See **PADs** page 10

Nelson is a product manager at BBN Communications Corp., a packet-switch vendor in Cambridge, Mass.

MARKET FORECAST

Vendor slowdown creates instability

Industry analysts offer 1987 assessments.

BY PAM POWERS
Senior Editor

After a year of anemic financial performance on the part of vendors, users are a little skittish as they greet 1987. In retrospect, 1986 was a year of carnage, as numerous companies endured hostile takeovers, debt-ridden balance sheets, layoffs, and the shedding of product lines and entire divisions.

A strong industry recovery isn't expected for some months yet; forecasts project another down year. The continued slowdown will create greater vendor instability, and that translates into increased confusion on the parts of users. Analysts told *Network World* what users should look out for this year in assessing different products and services.

Local-area networks

Patrick Gordon, director of data communications research, The Yankee Group, Boston

We saw a big buildup of demand for 1987 with IBM's Token-Ring Network, but most products won't be deliverable until this year, particularly in the second half of the year.

With initial installations of the Token-Ring, we've seen that people aren't happy with IBM's networking software performance. Research shows that more than five users on IBM's Token-Ring causes performance degradation.

I would suggest, therefore, if users are going to buy the Token-Ring, they should be prepared to look at other networking software. It seems the real winner there is now Novell, Inc.

I expect IBM to make some price reductions on its Token-Ring adaptor boards in 1987.

Starlan will heat up this year, and we will see price reductions there, too. Starlan is a good solution for small- and medium-sized companies. The caveat is that the network operating software tends to be of a proprietary nature, particularly in the case of AT&T.

Some vendors may have troubles in 1987. I think that Corvus Systems, Inc. could bow out of the business; 1987 will be a make-it-or-break-it year for them. Corvus is stuck with a proprietary protocol, and they appear to have a lack of market focus. I expect 3Com Corp. will be very successful in 1987.

Customer premises equipment

Fritz Ringling, vice-president, Gartner Group, Inc., Stamford, Conn.

The issue that will take preeminence is trade. The Federal Communications Commission has said it will launch an inquiry into purchasing procedures of U.S. telecommunications companies in 1987. That means they are in a position to prevent the Bell operating companies from buying equipment from countries that don't reciprocate with purchases of U.S. equipment. That threat may scare the BOCs away from the customer premises equipment business. It isn't worth the hassle for them.

Satellites

Richard Tallman, senior industry analyst, Dataquest, San Jose, Calif.

The very small aperture terminal vendors have fallen upon some rough times. With a relatively flat market projected for 1987, VSAT vendors will have to reposition themselves to remain competitive. As a result, I think users may find some interesting alternatives brewing with those vendors.

Some time this year, the People's Republic of China is going to launch a satellite for Western Union Corp. That will, to some degree, determine whether the satellite industry makes some recovery. As of now, there is a large potential for capacity loss at the end of the decade and little evidence of launch vehicles to be available before then.

Packet-switching networks

Audrey Mandela, senior analyst, The Yankee Group, Boston

With value-added networks, users in 1987 should evaluate not just price, but complete services, concentrating on applications developed to meet user needs, not those the vendor has developed to take advantage of available technology.

Also, I would say to be careful when asking for pricing. There is more to be gained from asking for a discount than one might think. The published price doesn't mean you can't get a 30% discount.

I think the BOCs need to know more about applications before they compete effectively in packet switching. The BOCs we've talked to need to do some self-education as to what users actually do with packet networks. When it comes to promoting services, they have a long way to go.

However, I'm not as terrifically pessimistic about BOC packet nets as are some analysts. [Southern New England Telephone], for example, has found a developing market in telecommuting. They're doing some interesting things — maybe the rest will follow.

See **1987** page 10

1987 from **page 9**

We've seen much more interest of late with private packet-switching networks. Some vendors are doing interesting things with combined packet-circuit switches and are getting the prices down to appealing levels.

In 1987, technological innovations with packet switches will make them useful for a lot more applications than in the past.

Long distance

Richard Tallman, Dataquest

In 1986, US Sprint Communications Co. sold its fiber network on quality, not price. That will change. A spate of price reductions will translate into big savings for users. In fact, those price reductions may trigger price erosion in all those markets competing with the long-distance carriers.

Network management

Patrick Gordon, The Yankee Group

In 1987, there will be numerous announcements for support of IBM's Netview. T-1 vendors closest to the data center have already announced support. Next, you will see multiplexer and modem vendors announcing support.

Modem-based network management vendors will have to look to support Netview while retaining their network management added value. Netview PC will become the standard program for network management.

ISDN

George Newman, editor, CIR Newsletter, International Data Corp., Framingham, Mass.

In 1987, users should beware of preliminary ISDN products such as interface cards, terminals and private branch exchange products. Vendors will promise things that aren't even here. Much of what we call ISDN has yet to be defined by the Consultative Committee on International Telephony and Telegraphy.

Open Systems Interconnect (OSI) vs. Systems Network Architecture

Fritz Ringling, Gartner Group, Inc.

Users need to be aware that SNA is a moving target. It is always evolving and adjusting to meet market needs. SNA is not nearly as open as IBM claims it to be.

The European governments and NATO now require OSI interfaces for bidding on contracts.

The U.S. will follow suit, but more slowly. As of now, there's no official government pressure here to force vendors into supporting OSI. OSI will become a reality in Europe long before it is here, if ever.

In 1987, users should keep bridges and gateways between OSI and SNA to a minimum because, at this point, it takes a lot of horsepower to interface between the two. Another drawback is that many of them are vendor-dependent. ◘

PADs from **page 9**

Network security

Multiapplication, multicommunity networks need greater control over network connections. Host computer security alone is often insufficient. As the user's entry point to the network, the PAD is the ideal place to handle part of the authentication and connection process. Working with a central access management system, PADs both play a role in network security and provide a clear, user-friendly network interface.

Usage accounting

Whether for internal chargeback, billing or capacity planning, today's networks need to report on user/session activity. The PAD is ideally situated to provide much of this call accounting data: per-user activity, connections requested, per-call usage and start/stop time. These functions work closely with the access management and network management facilities.

Management, control, growth and change

Many PADs fall within the purview of today's network management systems. This, when combined with the opportunity to replace multiple overlapping networks and access devices, creates an environment in which fewer network components are more readily managed and controlled.

Few networks today remain static. Common-backbone architectures, particularly with multiprotocol PADs, reduce the effort in adding hosts, users and sites.

New capabilities

Today's PADs offer users new and unique capabilities. PADs now allow BSC devices to communicate with different hosts, a feature not available in standard BSC. SNA PADs can do the same for SNA users, something standard SNA approaches cannot do without great cost and effort. BSC and SDLC polling can be done locally, rather than passing unnecessary traffic through the network.

Finally, migration to an X.25 transport base made possible by PAD capabilities can bring much-needed improvements in transmission reliability, capacity sharing and leveling. ◘

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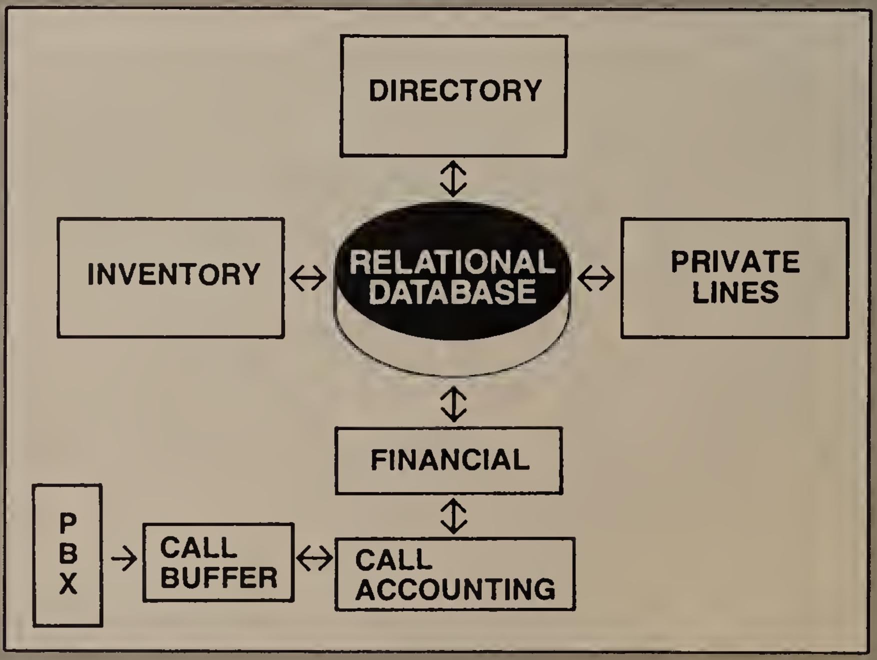

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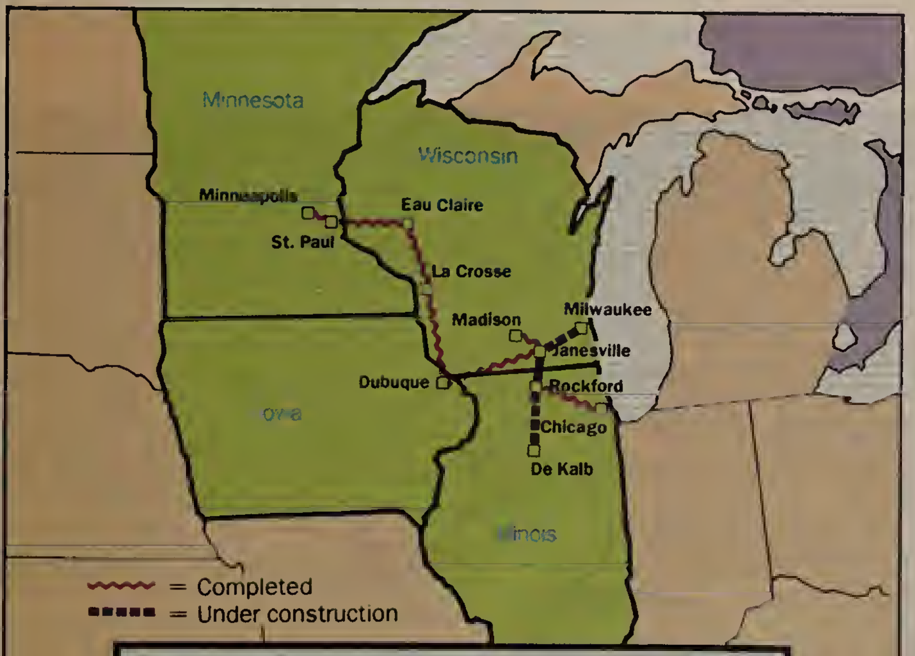
TELECOM TRENDS

Chicago goes all-electronic

Chicago's 46th and last switching center was converted from electromechanical to electronic switching. This event ended an 18-year equipment conversion process. The cutover at Illinois Bell's Irving, Ill., switching center makes Chicago the nation's largest all-electronic telephone services city, the Bell operating company said.

Carrier snapshot
Norlight



Network route miles:	670 (planned) 570 (operational)
Transmission media:	Fiber-optic cable
Services offered:	Point-to-point private lines
Service speeds:	1.544M bit/sec and 45M bit/sec
Founded:	September 1985

SOURCE: NORLIGHT, MADISON, WIS.

COMMUNAL NETWORKING

WillTel and Norlight pen net sharing agreement

BY BOB WALLACE
Senior Editor

TULSA, Okla.— In an effort to increase its network reach and attract new users, Williams Telecommunications Co. (WillTel) has inked an agreement with Norlight that will provide each carrier access to the other's network.

Under the agreement, WillTel will gain access to Norlight's four-state fiber-optic network, which, upon completion in early spring, will boast roughly 670 network miles. The Norlight net serves cities in Minnesota, Illinois, Wisconsin and Iowa. Norlight is a partnership of five Midwestern electric utility companies. (See graphic above.)

The Madison, Wis.-based Norlight, WillTel claimed, will gain full access to the entire National Telecommunications Network. This consortium of seven regional fiber-optic carriers is nearing completion of an 11,951-mile digital microwave and fiber-optic cable-based network.

The WillTel network, composed predominantly of fiber-optic cable, uses long-haul digital microwave links to tie Washington, Oregon and Idaho to the lightwave net backbone. WillTel spokesman Dennis Weiser claimed roughly half of the 4,441-mile system is already operational. The network currently serves cities in Oregon, Idaho, Nevada, Wyoming, Utah, Colorado, Kansas, Missouri, Iowa, Minnesota and Illinois. ☑

> *"WillTel will gain access to Norlight's four-state fiber-optic network, which will boast roughly 670 network miles."*

ANALYSIS

One-stop deal may cost more

Pros, cons of one-vendor net control.

BY BOB WALLACE
Senior Editor

One-stop shopping for communications equipment, services and support may prove to be a boon for some users, but a bane for others hoping to capitalize on true market competition.

Judging by the planned actions of EDS Communications Corp., Northern Telecom, Inc. and others, the concept of packaging network design, management, installation and operation will transform into reality for users in 1987. Companies providing facilities management services can now design, install and service networks.

Northern Telecom's entry into the total facilities management fray with the Telecommunications Facilities Management program is already under way.

Electronic Data Systems Corp. is still planning its strategy for EDS Communications, a company formed to provide complete network packages. And AT&T, free to merge its communications and information systems divisions, will likely increase its emphasis on packaging equipment, service and

See **One-stop** page 13

CROSS TALK

BOB WALLACE

BELLCORE's 'Notes' lifts the veil of fog

Telecommunications managers singing the Bell operating company blues and lamenting LATA networking should find Bell Communications Research, Inc.'s (BELLCORE) "Notes on the BOC Intra-LATA Networks" a reference aid of inestimable value.

The publication delineates the BOCs' geographical boundaries and explains what actions have taken place within these local access and transport area limits.

The volume includes 16 sections followed by a glossary designed to steer users through rocky industry jargon waters. "Notes" also lists a number of related technical references available from BELLCORE and other sources.

BELLCORE, which claimed the text is used to train its engineering, traffic, operations and network planning personnel, explained that "Notes" may be a useful reference book for users, vendors, interexchange carriers, communications consultants and others.

The publication offers users an overview of the BOCs as well as information on each BOC's network layout and configuration, equipment and system characteristics, and network services and architectures.

Other information listed includes BOC network surveillance and control, transmission media used, interconnection with terminal equipment and synchronization of the intra-LATA digital network.

According to Charles Zebe, BELLCORE network planning district manager, "[The BOCs] are no longer identical parts of a fully integrated national network." He explained that the publication provides a road map to the generic requirements of each BOC intra-LATA switching network, presenting a view of the configuration of the nets and how they operate.

"Notes on the BOC Intra-LATA Networks," document number TR-MPL-000275, is available from BELLCORE and costs $150. For additional information, contact BELLCORE at (201) 699-5800.

▶ PRICE PARING

N.J. Bell cuts rates up to 25%

NEWARK, N.J.— New Jersey Bell recently announced rate reductions as large as 25% on calls the Bell operating company handles between Northern New Jersey and New York City, and between Southern New Jersey and the Philadelphia metropolitan area.

The new rates, already in effect, apply to calls from the New Jersey counties of Hudson, Bergen, Essex, Passaic and Union, into any of the five boroughs of New York.

New Jersey Bell claimed users in Burlington, Gloucester and Camden, N.J., counties who call Pennsylvania's Bucks, Chester, Montgomery, Philadelphia and Delaware counties can also save by using its services, rather than those of AT&T.

The savings are automatic for customers in the above-mentioned counties who do not yet have Equal Access, a dialing service that enables users who dial 1 plus the area code and number to make long-distance calls.

Customers in the counties with Equal Access can save with New Jersey Bell's New York Link and Pennsy-Link services by dialing 10NJB plus 1 and the number they are calling, regardless of which long-distance carrier the user has selected, according to New Jersey Bell.

Under the new daytime rates, users will save 7 cents on the first minute and 1 cent on each additional minute for calls placed between one and 10 miles from the user location. The company claimed discounts of 38% for evening and 53% for night and weekend calls can be realized. ☑

▶ AT&T

Calif. rates cut by 4.5%

BY BOB WALLACE
Senior Editor

SAN FRANCISCO — AT&T has reduced rates for intrastate calls made in California by 4.5% — a $68 million overall cut.

While the cost of many services will decrease, private-line service rates will be increased, and discounts for intrastate long-distance calls will be reduced.

The rate slashings, already in effect, are the result of two recent rulings by the California Public Utilities Commission (PUC). One PUC interim decision in AT&T's rate case reduced and restructured many AT&T services. The decision also imposed a 2.5% surcharge on most intrastate long-distance calling, pending a review of AT&T financial data.

The PUC also ordered AT&T to pass on to California customers savings from the reduced prices AT&T pays local operating companies for access lines.

AT&T's long-distance evening discount dropped from 25% to 20%. The night/weekend discount went from 60% to 40%. ☑

> *"The cuts are the result of two recent PUC rulings."*

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One-stop from **page 11**

support.

Industry analysts also expect a second contingent of companies to offer total facilities management services. Gerald Mayfield, president of the Professional Services Division of the Stamford, Conn.-based DMW Group, a market research and consulting firm, said this group could include Martin Marietta Corp., McDonnell Douglas Automation Co., and possibly one or more long-distance carriers.

"Users that are not comfortable managing their own networks will look to systems integrators for answers," Mayfield said. "There are several parties out there seeking venture capital to finance systems integration efforts."

Vendor response to the $4.5 billion, 10-year Federal Telecommunications Systems (FTS) 2000 contract also demonstrated to the telecommunications industry the willingness of long-haul carriers, local telephone companies and systems integrator firms to join forces to offer complete communications solutions when the price is right.

But one industry analyst doesn't think vendors will attempt to provide total facilities management to users other than the federal government.

"It's a great idea, but it will never sell to users," remarked Brad O'Brien, an independent consultant and part owner of Perspective Telecommunications Group, a Paramus, N.J.-based consulting firm.

"The federal government is a special breed of cat," he said in reference to the FTS 2000 contract.

"You can't use FTS, or action in any government bids, as a bellwether for what might happen in the general communications industry," O'Brien said.

A return to a single point of contact for equipment and services would eliminate some of the problems communications managers experience in creating and operating multivendor networks. The need to deal with third-party network design, installation and maintenance firms for network support would also vanish.

But the cost of equipment and services, which decreases in competitive markets, could rise, leaving the communications manager without sorely needed bargaining power. And all but the largest communications equipment manufacturers and local and long-distance service suppliers would be smothered in such an environment.

Users, however, seem determined to have their cake and eat it too. Some applaud competition in the service and equipment industries but also complain of problems with managing a network or multiple nets comprising equipment and services provided by several vendors.

Others long to return to the days of one-stop shopping but express their delight in lower service and equipment costs — a result of competition.

Although many users would warm to the idea of relinquishing control of their communications networks to firms offering total facilities management services, others will opt to continue running their own networks.

Robert Housten, telecommunications management vice-president of the First National Bank of Maryland in Baltimore, said he would not entrust the bank's communications network to an outside firm.

"We have a very parochial view of network operation here," he said. "We don't want to let someone else control our destiny."

The communications manager of a Boston-based company, who asked not to be named, bristled at the thought of firms offering total facilities management services.

"Such groupings would wipe out competition and, in some markets, reduce competition to the extent where small customer premises equipment vendors and resellers would be put out of business," he said. ◘

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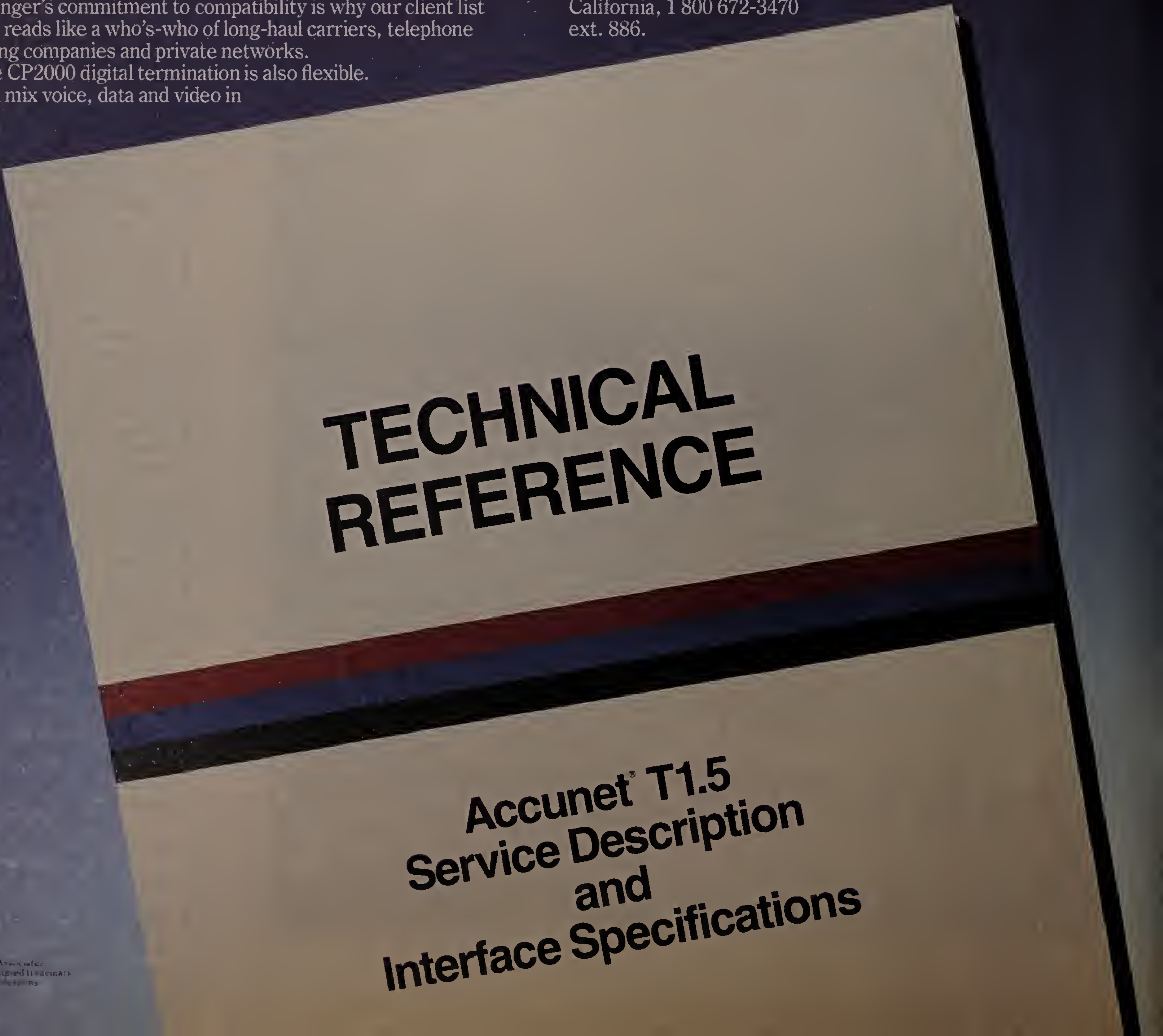

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Service Description
and
Interface Specifications

[illegible] Associates
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DATA DELIVERY

> “The corporations that are the most successful in completing an acquisition are the ones that get their hands bloody. These firms realize that the other company's employees are a commodity, and they manage an acquisition like any other business decision. When companies try to handle a merger at an arm's length, disaster often occurs.
>
> **Frank Dzubeck**
> President
> Communications Network Architects
> Washington, D.C.

▶T-1 MULTIPLEXER MARKETING

NET chief discusses firm's, industry's future

CEO Bruce Smith nixes rumors, outlines sales strategy.

Network Equipment Technologies Co. (NET), based in Redwood City, Calif., has made the successful transition from start-up company to established vendor. The company is capturing a growing portion of the expanding T-1 multiplexer market and plans to make a public stock offering early this year.

Network World *Senior Editor Paul Korzeniowski recently interviewed Bruce D. Smith, NET president and chief executive officer, about customers' buying considerations and the company's future directions.*

What type of relationship does NET have with IBM?
There is no formal relationship or any type of marketing agreement between NET and IBM. We will support IBM's Netview [network management system], and often we find ourselves serving the same customers.

We have a similar approach to IBM's, so customers satisfied with how Big Blue does things probably find our approach very attractive. We will work closely with IBM in situations where a customer has urged that to happen, but the rest of the speculation does not deserve comment.

Have there been any acquisition bids for NET, and how did the company react?
We've been approached but the people who put the company together have not been real happy being part of a large corporation. We didn't want to use our NET experience as the next rung on a ladder to somewhere else.

Have you noticed any patterns emerging as customers implement T-1 networks?
Typically, customers say they want to connect X locations and move Y amount of information. Inside a year, they are connecting two, three, maybe more Xs and moving four or five times the amount of Y.

The market for internal communications is developing much more rapidly than I expected. A shift in how information moves about a corporation is under way, at least among the top 200 to 400 companies.

Are many of these companies trying to use communications as a strategic weapon?
There is a lot of strategic thinking in communications-intensive companies. Two items are fueling this shift.

Bruce D. Smith

At the user level, distributed data processing is ubiquitous. Users then demand much more information flow and more connectivity.

Second, the decision process for communications purchases has moved up from a relatively low-level problem to a key competitive business issue at or near the top of an organization. With this shift, budgets, effective power and decision-making capabilities have come to this business that weren't here five years ago.

How does strategic thinking come about?
Previously, the problems being solved were, “How do I move information from here to there in a cost-effective manner?” Now, before users ask that question, they say, “I want to change the way in which my business operates and alter the economics of the business. How can I use technology to do that?”

Such questions are much more fundamental to a company. This type of questioning often leads to development of new applications.

What sort of demands does strategic thinking place on a vendor's sales staff?
Customers demand that we provide womb-to-tomb capability. Historically, IBM understood the businesses they were selling into and provided a lot of consulting support.

Customers could tailor IBM products so they produced effective and correct business results. The challenge for the communications industry is to move from a black box to a problem-solving industry.

What has NET done to help its customers meet specific industry requirements?
We have special industry segment consultants who understand the economics of a specific industry. They work to find out what we are selling and the way it is applied so we can try to optimize the business

See **NET** page 18

DATA DIALOGUE
PAUL KORZENIOWSKI

Data dialogue ditties

Lies and half truths. The biggest challenge for T-1 manufacturers is to make good on the raft of product features promised in the last few years. In the rush to gain needed publicity, T-1 vendors said they could produce different multiplexers equipped with sexy features.

When the time came for these companies to ship their products, some models, and many of the features, were not ready and were promised in future product releases. At first, customers were not too concerned because they were merely experimenting with T-1 and used the devices for simple point-to-point applications. As their networks grew, these customers tried to use some of the more elaborate functions, and certain products failed miserably. A few companies claimed dynamic rerouting capabilities, even though they failed to deliver simple capabilities, such as drop-and-insert.

To say some companies preannounced certain features would be generous. Unfortunately, in some cases, it appears they deliberately misled users and investors. Some implementation horror stories should emerge in the next few months. (Any users wishing to vent their spleens can call me at (617) 879-0700.)

Companies are also evaluating which markets to shoot for and the number of models they should offer. Rather than supporting a complete line, they are retrenching by renaming existing products and dropping some models. Amdahl Corp., Spectrum Digital Corp. and Cohesive Networks, Inc. have already revamped their product lines, and other vendors may follow suit.

Determining which vendors truly offer which features and models is a full-time job. Vendors should be wary because users may tire of unkept promises and simply halt T-1 purchases.

Missing the point. Lately, there has been a lot of talk about how local-area nets failed to live up to their billings. Some say that 1986 was not The Year of the LAN and predict that there will never be such a year.

Yet, during 1986, revenue at Novell, Inc. and 3Com Corp. increased by nearly 100%. Year-end revenue for the two firms will approach $100 million, close to that of thriving, established communications vendors such as General DataComm Industries, Inc. and Timeplex, Inc. Sales of IBM's Token-Ring Network and AT&T's Starlan appear to be exceeding initial expectations, and some smaller players also report healthy returns.

If other markets were as unsuccessful as the local network market in meeting expectations, there would be no industry slump. 1986's results belie the naysayers and prove that some people are just never satisfied.

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NET from **page 15**

objectives of the buyer.

We've walked away from orders where we felt the application was not correct or it was likely that there would be a problem or a failure.

How large are the company's sales and support staffs and how fast are they growing?
Our sales and support staffs are probably growing faster than the company. In sales, there are more than 50 people. In support, there are two layers; we use our own support staff and a third party as well. We have 50 of our own people plus the second group, which is trained and dispatched by us.

Why did NET last fall acquire ComDesign, Inc., a manufacturer of low-speed multiplexers and private branch exchanges?
Our customers want to extend the control of their networks beyond the backbone equipment we deliver. We were responding to our customers' needs, rather than trying to enter the data communications business.

Also, ComDesign historically sold outside of the top 600 companies but did not have a distribution arm at the high end of the marketplace. We have such an arm.

Will NET expand into any other data communications markets?
We certainly haven't finished broadening our product line, but it is not clear whether we will expand by developing our own products or through further acquisitions.

What markets would NET like to move into — modems and packet assemblers/disassemblers?
It's unlikely to be those kinds of products. Currently, we are in the preregistration phase for a public stock offering, and I can't comment on future product directions.

Is NET interested in selling to small- and medium-sized businesses?
There is a market for such sales, and some companies have been very successful in that market. We have not attempted to address it because we are sticking to our own knitting.

However, we will continue to reach for business where we think we can contribute significantly in terms of "value added" to the customer and where we can continue to cover sales effectively after they are made. That philosophy places some limitations on our ability to grow. But we have yet to determine those limitations. If it affects present customers, we will not move into those new markets.

Are users asking for T-3, 45M bit/sec capabilities?
That market is very small at this point, but we expect it to open up in the next few years. The industry has always moved in the direction of bigger, faster and more complex.

Bigger is T-3, faster is more real-time information and capabilities, and more complex means more interconnection. We expect those three items to be played out in the next few years.

What will the T-1 market look like in a few years?
We are seeing a bifurcation of the traditional data communications market. One segment is involved in the networking needs of the user and includes manufacturers such as Timeplex, Inc. and NET. On this strata, a vendor has to solve a customer's networking problems and supply him with system-level support. In a few years, there will be only a handful of companies left in this segment.

The second segment consists of the traditional, hardware-oriented black box sales. Many data communications companies are in this market segment, where production efficiencies are a critical success factor.

We expect a shakeout in this segment as well. The venture capitalists have started far too many companies for the size of the market.

When will the shakeouts occur?
A complete shakeout will occur later than 1987 or 1988. How much later, I'm not sure. The number of players has already begun to shrink. Digital Communications Associates, Inc. purchased Cohesive Network Corp., for example, but it will take much longer before we see market revenue begin to fall.

Do you see the Japanese entering the market?
They can become significant players in the black box business. In the high end of the market, the software quotation is high enough and unique enough that they are a long way from being an effective force. Added value comes from software, network control and an understanding of a customer's business. The Japanese have not shown a tendency to be very effective in those areas.

Also, there are approximately 10 Japanese vendors who are either eyeing or moving aggressively into the Digital Access and Crossconnect System market. These companies will force U.S. manufacturers to make their products more price competitive and their production methods more efficient. ☒

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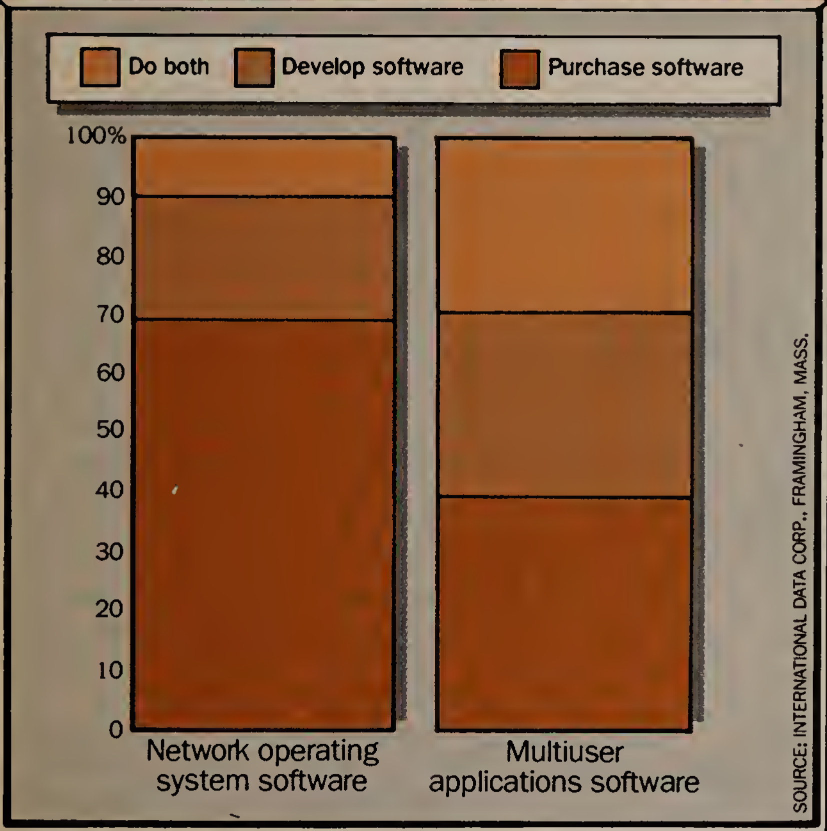
LOCAL NETWORKING

Who is responsible for local networking decisions?

> “These decisions have become more corporate, more strategic. There will be no more LAN mavens. Vendor decisions are being made at a much higher level than they were a few years ago.
>
> **Mark Stahlman**
> Securities analyst
> Sanford C. Bernstein & Co.
> New York

User plans for local networking software:
Purchase vs. in-house development decisions



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

NETWORKING SURVEY

Fortune 500 lack LAN game plans

Fifty percent unsure on local net budgets.

BY PAULA MUSICH
Senior Editor

Local networks are still a puzzle for most Fortune 500 MIS executives responsible for local network budget expenditures, according to a recent survey.

More than 50% of the MIS directors queried did not know whether they would spend more, less or the same amount on networking hardware this year as they did in 1986, according to the Sierra Group, a Tempe, Ariz.-based market research firm. Of those who planned for local network spending, 25% planned to spend less than they did in 1986, and 19% planned to spend more.

Paralleling this uncertainty was the finding that nearly 40% of the MIS executives surveyed did not have a preferred vendor. “Obviously, a large portion of the Fortune 500 LAN market is up for grabs,” said survey director Marty Gruhn.

“What we’re finding with users is a lot of first-generation fiddling. I call it the ‘trash-it syndrome.’ Users are experimenting with local networks and waiting for vendors to solve problems like high costs, unwieldiness and limited software before they make large-scale commitments,” Gruhn said.

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TOKEN-RING-TO-ETHERNET

Proteon adds interface

BY PAULA MUSICH
Senior Editor

WESTBOROUGH, Mass. — Proteon, Inc. filled a gap in IBM’s Token-Ring Network offerings last week with the introduction of a routing interface for its gateway product that enables IEEE 802.5-based nets to be linked with several other industry-standard networks.

The p4210 router card plugs into Proteon’s p4200 gateway and supports internetworking between Proteon’s ProNET-4 — and other IBM Token-Ring-compatible networks — and Ethernet-type local networks, as well as Advanced Research Project Agency Network and other wide-area nets. IBM only provides bridging capabilities between its own Token-Rings.

A single Proteon gateway can concurrently support Xerox Corp.’s Xerox Network Systems protocol, the Department of Defense’s Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.’s DECnet protocol.

It also works with Proteon’s ProNET-10 10M bit/sec network and ProNET-80 80M bit/sec net.

The interface is a multibus card that fits into the backplane of the modular gateway. The gateway is a 68010-based processor that includes internetworking software. Interfaces can be added to the base unit for each connection the user wants supported.

The new interface supports all of the wire types specified by the IBM Cabling System except for optical fiber. It also operates with the cabling alternatives provided in IEEE 802.5-compatible offerings from Ungermann-Bass, Inc. and 3Com Corp., according to Proteon’s director of marketing, Tony Bolton.

The routing software also supports network management functions, such as the tracking of hosts added to or removed from the network and packet flow monitoring. The interface is priced at $3,590, including software. It will be available by the end of January. The base unit of the gateway is priced at $4,400. The Ethernet adapter is $2,450. The ProNET-10 adapter is priced at $3,850.

Software that adds routing functions, called a packet forwarder, is priced at $1,350. The 56K bit/sec adapter is priced at $2,970. The T-1 adapter is $3,750, and the ProNET-80 adapter is $8,500.

“We hope the inclusion of this interface in our gateway will sway more customers toward Token-Ring,” Bolton said. “It makes their decision to try the Token-Ring easier because now they have a path between the different networks. Without it, they’d have to install a network that couldn’t communicate with existing Ethernet, ProNET-10 or ProNET-80 networks.” ◼

LANMARKS

PAULA MUSICH

Future of LANs: No assembly required?

Harry Saal, founder of Network General Corp. and Nestar, Inc., has called the task of local network configuration a black art.

For the uninitiated, trying to configure a personal computer network is like assembling a microcomputer-in-a-kit with a 1-page sheet of instructions. Documentation assumes the reader has a good understanding of MS-DOS, and it is written for a sophisticated personal computer user.

Configuring a local network for optimum network performance currently involves trial and error. Ideally, however, network configuration should be considered even before the net is purchased. Users should determine what they want the network to accomplish, what kinds of applications will be run on the network and the number of users who will be supported.

Value-added reseller Keith Brown, whose firm, Brown and Associates, Inc., has installed some 100 personal computer networks, breaks down actual setup into two steps. The first is installing the network operating system, which includes determining cache buffer sizes, time slicing parameters and the amount of memory to allocate for caching files. How the network operating system is configured can affect overall network performance.

The second step, configuring applications software, includes setting up directory structures, determining what files will be shared and setting up read/write access. This step can impact the amount of time required to administer a network.

This 2-step process takes Brown and Associates two days to complete. If a user were to attempt a similar configuration, Brown estimated it would take between a week and a month to accomplish, depending on the technical proficiency of the installer.

The complexity of configuring a network has created a new breed of value-added resellers, changed the way some retailers do business and made consultants out of the technically astute who are willing to im-

See **Configuration** page 20

Survey from **page 19**

MIS executives are also still grappling with issues such as network management and how to plan for long-term net growth, she said.

Despite the uncertainty, nearly 50% of the MIS executives who expressed a preference said that IBM was their preferred local networking vendor. "MIS is looking to its primary systems vendor as a main source of supply for local-area networks," Gruhn said. Digital Equipment Corp. and Novell, Inc. came in a distant second and third, respectively, both with under 10% of the expressed preference.

Where the primary system vendor is preferred, the Sierra Group felt MIS executives were planning for strategic corporate networks. "They don't look at networking as a discrete issue. They're talking about integrating the local-area networking issue into the broader strategy for information systems within their organization," said Merrily Shinyeda, president of the market research firm.

The Sierra Group found a divergence of opinion between the largest 250 companies in the Fortune 500 and the second largest 250 companies. More than 73% of the leading 250 chose IBM as the preferred local network vendor, while less than 32% of the second tier preferred IBM as a network supplier. Preferred vendors among this group include DEC, Novell, Hewlett-Packard Co. and Xerox Corp.

> *"Overall, we've found that of all the technologies being sold, one of the greatest opportunities for vendors is in local-area networking."*

Still, more than 50% of the Fortune 250 specified preference for more than one network vendor. "The significant inroads evident from suppliers other than IBM in the first 250 indicate that IBM's hold on the market is tenuous at best," Gruhn explained.

Only slightly more executives in the second Fortune 250 expressed a preference for multiple networking vendors, compared to IBM. "IBM's lack of a clear strategy and lack of deliverable product has worked to its disfavor in the second 250," Gruhn said. Because a much lower percentage of the second Fortune 250 expressed a vendor preference, she postulated that there is greater network use and vendor standardization in the larger firms.

In the networking software arena, 86% of the MIS directors interested in local networks planned to increase networking software purchases. Gruhn felt that these executives intend to buy software that will enhance existing systems.

"Overall, we've found that of all the technologies being sold, one of the greatest opportunities for vendors is in local-area networking. A lot of these companies simply have not decided to go with one vendor or another," Shinyeda said.

What will sway the undecided? The No. 1 issue is good support, although price is also a strong issue and compatibility a close third. Vendor credibility is also an important issue for some, according to Shinyeda.

The report, The Fortune 500 MIS Buying Plans — 1987, is available for $1,200.

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> *"These high priests of net configuration carved out a nice living for themselves."*

Configuration from **page 19**

merse themselves in the black art of network configuration.

These high priests of network configuration, whose numbers include some who aren't very well-qualified to practice the art, have carved out a nice living for themselves.

For those who can't afford the consulting fees, don't have the time to spend or just don't fit the "early adopter" category of users who take on new technology, it will take making local network configuration as easy as "no assembly required" to make local networking attractive.

Perhaps this last category best describes the large number of personal computer users who have not yet taken the local networking plunge.

COMMUNICATIONS MANAGER

> “Systems that can’t talk to each other offer great security.
>
> **Lincoln Faurer**
> President
> Corporation for Open Systems
> Speaking on security in open systems architecture at the 18th National Data Systems Forum & Exhibit

Projected telecommunications salary ranges in 1987

Engineers	New York area (in thousands)	Elsewhere in U.S. (in thousands)
No degree, experience	$24.3 to 33.2	$22.6 to 30.9
Degree, nonsupervisory experience	37.1 to 43.1	32.5 to 38.3
Installation manager, extensive supervision experience	37.0 to 46.4	35.0 to 42.3
Engineering manager	60.5 to 70.1	55.2 to 63.7
Communications managers and analysts		
Supervisor/jr. voice analyst	$30.3 to 39.6	$28.9 to 36.3
General consultant/analyst	35.6 to 47.6	31.6 to 45.7
Communications/consulting managers and directors	47.5 to 63.2	45.2 to 60.6

SOURCE: PERSONNEL RESOURCES INTERNATIONAL, INC., NEW YORK

▶ SHARED TENANT SERVICES

Managers face STS problems

Narrow margins pose a challenge.

BY BOB HAMEL
Senior Editor

Communications managers of shared tenant services have their hands full coping with a variety of problems that were not envisioned when the practice of sharing telecommunications facilities among multiple building tenants was first embraced.

The job of managing shared tenant services has been made more difficult by regulations that prohibit or restrict tenant sharing of

See **Shared** page 24

▶ FAX FRATERNITY

Facsimile users group offers news, education

Members will serve as consultants.

BY BOB HAMEL
Senior Editor

PHILADELPHIA — The American Facsimile Association is the newest kid on the users group block.

Touted as the first user association dedicated to facsimile and related technologies, the 2-month-old, nonprofit group hopes to become a focal point for facsimile information.

According to Administrator Arthur Felderstein, the association has a threefold intent. “We hope to represent the interests of all FAX users and to promote FAX technology to the general public,” he said. “The association will serve as a clearinghouse for FAX information and as a forum for sharing ideas. Members will also serve as consultants to telecommunications managers when and where needed.”

> *“We hope to represent the interests of all FAX users.”*

Felderstein said the group also hopes to play a role in the formation of facsimile standards.

Dynamic growth in the facsimile industry and the introduction of inexpensive facsimile units, that is, for under $1,500, prompted formation of the organization, Felderstein said. Based here, the association will publish a monthly newsletter containing facsimile industry news, management reports, and technical and marketing updates on facsimile products.

Felderstein said association officials have not yet finalized membership requirements or costs. He projects that membership will be roughly 3,000 by year end.

Members will enjoy reduced tuition rates for educational workshops and reduced rates for association shows and regional meetings. Members also will be provided with employment listings and referrals.

For more information, contact Susan T. Dunbar at (215) 893-4022 or FAX her a note on (215) 985-1719. The American Facsimile Association’s address is 1500 Walnut St., Philadelphia, Pa. 19102.

Attention users. *Network World* wants to help you celebrate recent hirings or promotions of your staff. If you or another user have been hired or promoted, please tell us who’s involved, along with the former and current title of that person.

Also, if possible, send a picture.

Network World cares about users.

GUIDELINES

BOB HAMEL

‘Tis better a bleeder than detached isolate be

The pyramid is being replaced by a circle. The traditional organizational chart, with interconnected boxes and lines branching from the president on down to the lowliest clerk, is out.

What’s in is a new computer-generated circular diagram that shows where and how information really flows within a company. And it can help communications managers determine how effectively they and their staffs are dealing with others in the company.

Netmap International, Inc., based in San Francisco, offers software that shows who within an organization is actually making decisions and where a manager could benefit from greater interaction.

The software shows what many business analysts have already concluded: Participating in the informal information network is integral to effective management. Most communication within a company is lateral and isn’t reflected in formal chain-of-command organizational charts.

How does the program work? Basically, the program has you identify which coworkers you and your employees have regular contact with, and how important that contact is, rated on a scale from 1 to 10.

The program throws out all links not confirmed by both sides and removes biases so that egocentric employees — yes, there are a few out there — who rate all associations as 9s have their scores lowered, as if the person on the other end thought the links rated only 2s.

The software then groups employees in networks where they have the most proven contacts. Networks get represented by circles, and employees with confirmed links are connected by lines.

Those who interact with many are called “bleeders,” because the ink by their names is so thick. The “detached isolate” is the person with no links. That person is a prime candidate for reassignment — or dismissal.

Going through the process can be quite revealing. By showing with whom you and your staff have regular contact, the program identifies departments within the corporation you are serving. It shows whether you are reaching the key decision makers — those who could back your strategic communications plans — within each department.

The program also indicates where you need to improve your ties with key corporate departments and personnel. If run over time, it can show whether you and your staff are becoming better at understanding and meeting the communications needs of the organization as a whole.

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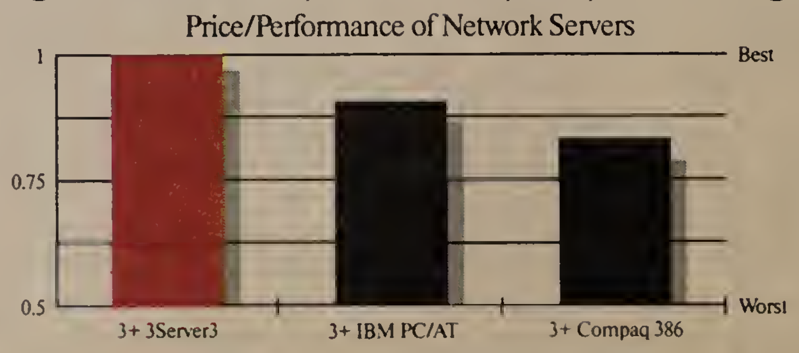
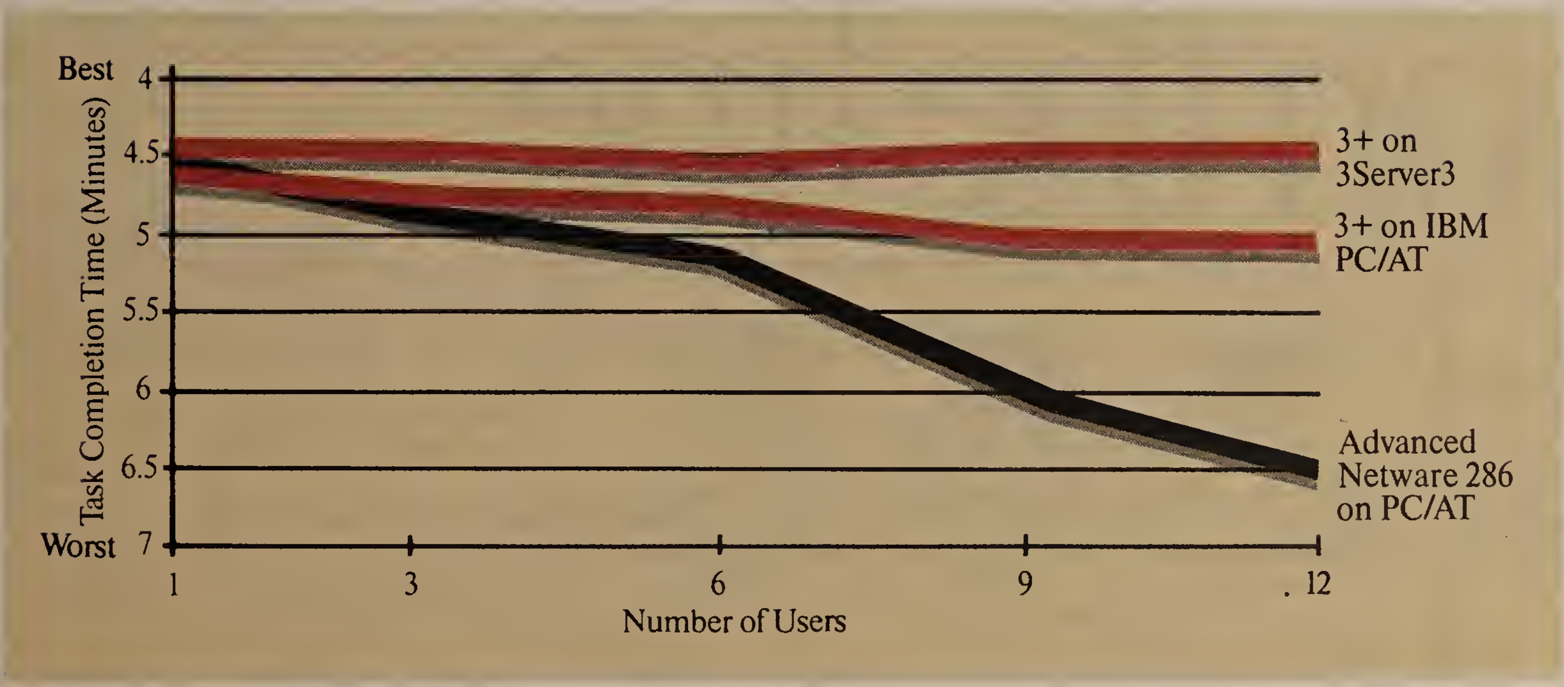
And the pair delivers a price/performance figure other combinations can't touch. At $5,995, a 70-megabyte 3Server3 costs far less than a similarly configured PC/AT or Compaq 386. In fact, you can add a 3Server3 and an IBM PC workstation to your network and still come out dollars ahead.



*Belmont Laboratories, Belmont, California: 3+ Version 1.1 on a 70-megabyte 3Server3; 3+ Version 1.1 vs. Advanced Netware 286 Version 2.0A on PC/ATs with 3 megabytes memory, internal hard disk.

And fast.



But whatever your choice in servers, it's the hardware and 3Com's 3+ software, working together, that really gets things moving.

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Shared from **page 21**

trunk lines in some states, long-distance rate reductions that have narrowed profit margins, and tenant hesitancy to use advanced services.

"The state prohibits us from offering shared trunk lines in our building," said Joe Torg, vice-president of Wilbur Boyd Communications, Inc. Wilbur Boyd manages the voice and data communications facilities for Bradenton Financial Center, a 12-story office complex in downtown Bradenton, Fla.

The state restriction forces every tenant group in the Bradenton Financial Center to be supported individually on the site's partitioned Ztel, Inc. PNX private branch exchange. As a result, the switch's trunk capacity has been, in Torg's view, filled to capacity.

Because the building's tenants have to pay for the local service carrier to install individual trunk lines and then lease equipment from Wilbur Boyd, it's not cost-effective for the smaller sized tenants to use the PNX. "Unless the tenant is big enough to need its own key system and can justify the cost of installing trunk lines, it's easier for the tenant to deal with the local carrier directly," Torg continued.

The switch partitioning necessitated by the regulation was also a problem. "Because our tenants are separated in the system, we can't offer them some of the switch's most desirable features," he said. Users on a nonpartitioned PNX switch could send messages to each other's telephones, whereas the Wilbur Boyd switch cannot. "We're only able to provide a subset of the switch's capabilities," he added.

> *"Tenants won't pay a 30% to 40% premium for one-stop communications service."*

One city in which local regulations have not hindered shared tenant services is Hartford, Conn. Shared Technologies, Inc. provides voice and data communications to CityPlace, a 38-story office building there. Larry Guilmette, manager of CityPlace, said he is enthusiastic about the Lexar switching system Shared Technologies uses. "By participating in the shared system, we had hoped to save about 20% on the building management's communications costs. We've fulfilled those expectations."

According to George Grove, state regulations are not the problem in shared tenant services — lower profit margins from reductions in calling rates are. Grove, president of Grove Associates, Inc., is active in multitenant services and telecommunications facilities management. "The problem is that, with reduced rates, managers are finding there's not a lot of profit margin in providing shared tenant services. Tenants won't pay a 30% to 40% premium for the luxury of one-site, one-stop communications service," Grove said.

Torg concurred. "In the past, our tenants saved on long-distance calling through the switch's least cost routing. Now, they still save, but the margins are less."

Grove also pointed out that offering data communications service through a switching system contains its own set of problems. "Managers are finding that tenants are hesitant to use shared tenant data services. The investment in training and the time involved in switching operating systems just aren't practical," he said.

However, if a data communications match can be made, it is worth it. Dean Witter Reynolds, Inc. is a tenant in CityPlace. Its brokers tie into Shared Technologies' on-site Digital Equipment Corp. VAX 11/780 on a time-sharing basis. Through the VAX's mail facility, the brokers tie into Dun & Bradstreet, Inc.'s data base. "It's much more cost-effective than a direct link to Dun & Bradstreet," said Alan Moutran, a first vice-president with Dean Witter. "The data communications capability is one of the important reasons we decided to use the switch," he added.

As communications manager, Torg said he has found the PNX's data communications capabilities let him provide cost-effective service for a local banking tenant. "The bank uses the PNX to connect to a service bureau in nearby Tampa, Fla. If we didn't go through the switch, we would have to have purchased or leased extensive multiplexer equipment to provide the connection," Torg noted. He estimated the switch has allowed Wilbur Boyd to save approximately $30,000 in equipment leasing and purchases in the first year of operation.

"The problems won't drive us out of business, but it does hinder our prosperity," Torg concluded. ☑

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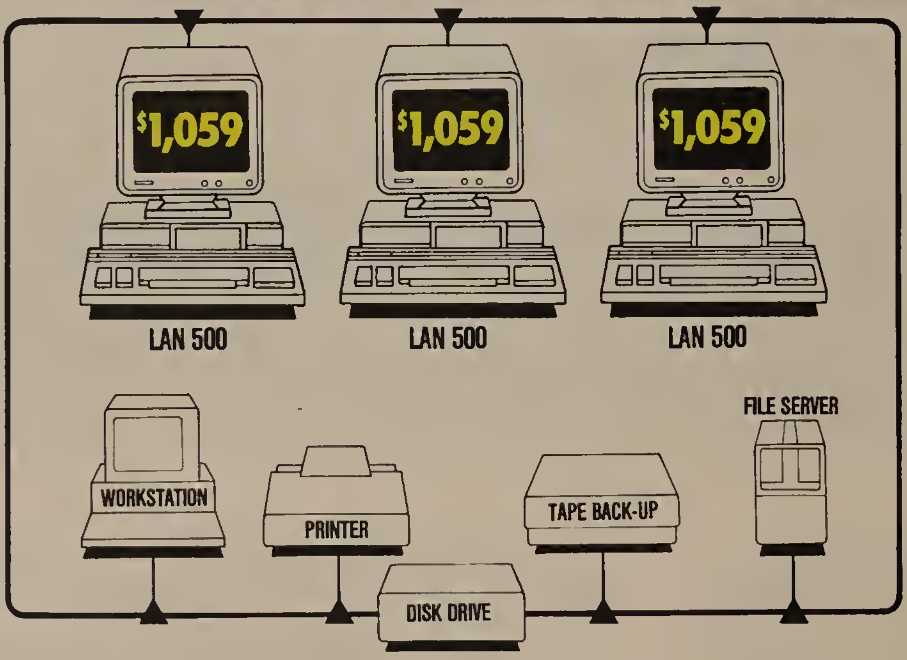

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NEW PRODUCTS AND SERVICES

See inside for:
- ▶Coax adapter with diagnostic capability
- ▶Portable DEC VT-102 clone

▶ CAMPUS CONNECTION

Applitek offers terminal gateway

Remote link to Burroughs, Sperry hosts.

BY JIM BROWN
New Products Editor

WAKEFIELD, Mass. — Applitek Corp. introduced a gateway that links asynchronous and synchronous terminals to Burroughs Corp. or Sperry Corp. hosts at distances up to 20 miles.

Designed for use in a campus network, the NI10/G gateway attaches to Applitek's UniLAN local-area network and extends the distance Burroughs terminals can be located from Burroughs hosts and Sperry terminals from Sperry hosts. Typically, the terminals are limited to the distance supported by an RS-232 connection.

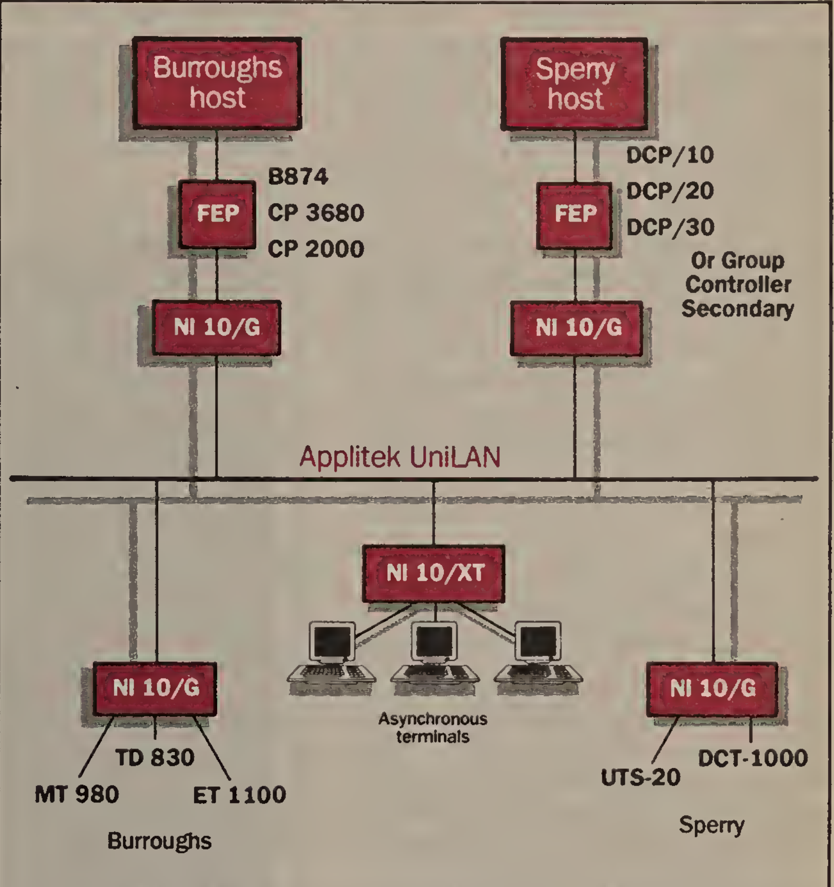
The device also supports connection of a mix of ASCII asynchronous terminals to Burroughs or Sperry hosts. Included in that list are Digital Equipment Corp.'s VT-52, VT-100 and VT-220; Televideo Systems, Inc.'s Model 925; and IBM's 3101.

The asynchronous terminals connect to an Applitek NI10/XT asynchronous terminal server, which is linked to a host site NI10/G providing terminal-emulation facilities. An Applitek spokesman said terminals with built-in VT-100 terminal emulation can access the emulation features of the NI10/G gateway as a VT-100.

Typical configurations involve terminals attaching to an Applitek NI10/G gateway, which supports up to 64 virtual circuits. The gateway transmits at 9.6K bit/sec over UniLAN to another NI10/G, which

See **NI10/G** page 27

Applitek terminal gateway to Burroughs/Sperry hosts



FEP = Front-end processor

SOURCE: APPLITEK CORP., WAKEFIELD, MASS.

Products & Services

Stat mux links eight asynch devices

Data Race, Inc. introduced a statistical multiplexer that links up to eight asynchronous devices over a leased line.

The **Mach VIII** operates with a detached full-duplex 4-wire synchronous modem or with an optional internal V.29 synchronous modem operating at 9.6K bit/sec. The internal modem includes a 2-channel time division multiplexer that supports simultaneous transmission of both asynchronous and synchronous communications.

Devices connected to a Mach VIII are able to run at speeds between 1,200 bit/sec and 19.2K bit/sec. The device employs data compaction and compression techniques, error detection and correction, and end-to-end flow control. The unit also has a separate diagnostic port that collects multiplexer operating data and transmits it over a dial-up modem to a central site.

Pricing

The multiplexer costs $1,295. The internal modem is priced at $1,195.

Data Race, Inc., Suite 108, 12758 Cimarron Path, San Antonio, Texas 78249 (512) 692-3909.

Device tests for data bit errors

Aydin Corp.'s Aydin Monitor Systems division announced a data transmission test set that measures and displays data bit-error test results.

Supporting speeds from 10 bit/sec up to 25M bit/sec, the **Model 604MI** measures bit errors, bit-error rates, block errors or second errors and displays the results on one of three screens. The unit can connect to half-duplex, full-duplex or simplex communications lines.

The rack-mountable device is programmed and controlled via an IEEE 488 interface bus. The device features RS-422, RS-232 and T-1 interfaces as well as a parallel digital printer port.

The 604MI lists for $8,300 while an Aydin-supplied digital printer costs $1,675.

Aydin Monitor Systems Division, 502 Office Center Drive, Fort Washington, Pa. 19034 (215) 646-8100.

Reflection Series software upgrades

Walker Richer & Quinn, Inc. released upgrades of its Reflection Series communications and terminal-emulation packages.

The **Reflection Series Release 2.0** links IBM Personal Computers and compatibles to Hewlett-Packard Co. and Digital Equipment Corp. minicomputers. Added to the Reflection packages were a toggle switch between personal computer applications and communications modes and execution of file transfers as a background task. Also added were versions capable of running on 3Com Corp. local-area networks using Bridge Communications, Inc.'s Etherterm board, IBM's PC Network and Ungermann-Bass, Inc.'s Net/One local net.

The Reflection 1 package emulates HP 2622, HP 2392, DEC VT-100 and DEC VT-102 terminals, while Reflection 2 emulates DEC VT-220 and Tektronix, Inc. 4010 terminals. Reflection 3 emulates DEC VT-102, HP 2392 terminals as well as HP 2623 graphics terminals. And Reflection 7 emulates an HP 2627 color graphics terminal.

Support for HP's OfficeShare local-area network was added to Reflections 1, 2 and 7. Also added to the Reflections Series was support for Microcom, Inc.'s Microcom Network Protocol (MNP) error-correction protocol.

Pricing for the Reflection Se-

See **Products & Services** page 26

▶ ARCNET SOFTWARE

PC tool works with NETBIOS

BY JIM BROWN
New Products Editor

HAUPPAUGE, N.Y. — Standard Microsystems Corp. released a package that enables personal computers attached to a Datapoint Corp. ARCnet-type local-area network to run programs designed for IBM's Network Basic I/O System (NETBIOS).

The two-module package operates as a background application on a personal computer equipped with an ARCnet connection and manages communications through an ARCnet local-area network card.

The software is reportedly based on standards published in IBM's Personal Computer Technical Reference Manual. It is designed to manage communications with other ARCnet-connected devices, including network versions of applications software, while other tasks are performed on screen.

Pricing

A NETBIOS-emulation software package supporting up to four ARCnet-connected personal computers costs $195.

Products & Services

Products & Services from **page 25**

ries ranges from $199 to $499. Support for the MNP protocol adds $50 to the package.

Walker Richer & Quinn, Inc. 2825 Eastlake Ave., Seattle, Wash. 98102 (206) 324-0350.

Coax adapter offers diagnostic capability

Star-Tek, Inc. introduced an adapter that incorporates an automatic loop-back test for troubleshooting the Type 3 twisted-pair wire to RG-62 coaxial cable connection.

All circuits that include a **Remote Diagnostic Loopback (RDL)** balun can be monitored from the wiring closet or a controller. The device supports transmissions up to 1,600 feet on 22-gauge wire vs. 1,200 feet with conventional coaxial cable baluns, according to Star-Tek.

An RDL incorporates a semiconductor surge suppressor and works with a Star-Tek handheld tester. It reports whether a circuit is open, has a short, is undergoing reverse polarity or has failed diagnostics. Compatible with IBM 3270 Type A devices, an RDL balun is available with an RJ-11 modular jack or a cord with an RJ-11 or RJ-45 plug.

The RDL is priced at $32.

Star-Tek, Inc., P.O. Box 218, Worcester, Mass. 01613 (617) 792-2529.

Portable version of DEC VT-102 terminal clone

Informer Computer Terminals, Inc. announced a portable version of its Digital Equipment Corp. VT-102-compatible terminal.

The firm's **207-102** terminal features a 9-inch display screen and flipdown keyboard. It connects to a DEC host over an RS-232-C connection or an optional integral V.22bis 2,400 bit/sec dial-up modem.

Using Informer's proprietary Protocol Converter Support (PCS), the terminal will reportedly connect to a protocol converter accessing an IBM mainframe environment. The terminal includes an external asynchronous ASCII printer port.

A 207-102 Model 701J terminal with Informer's PCS costs $1,390. A 207-102 with PCS and the optional V.22 bis modem lists for $1,690, while a 207-102 with the modem, PCS and Microcom, Inc.'s Microcom Networking Protocol error-correction protocol is $1,890.

Informer Computer Terminals, Inc., 22936 Mill Creek Road, Laguna Hills, Calif. 92653 (714) 855-3112.

Asynch, synch fiber-optic modems out

Rad Data Communications, Inc. introduced a synchronous modem and an asynchronous modem that transmit over duplex fiber-optic cable.

The **FOM-6A** asynchronous modem and the **FOM-6S** synchronous modem operate in half- or full-duplex at speeds up to 19.2K bit/sec over distances up to two miles.

Both units include an RS-232-C or a V.24 interface and can be used in either a point-to-point or point-to-multipoint configuration. The FOM-6A can be switched for data communications equipment or data terminal equipment operation, while the FOM-6S will support internal, external or loop-back timing signals.

The FOM-6A costs $149, and the FOM-6S costs $249.

Rad Data Communications, Inc., 151 West Passaic St., Rochelle Park, N.J. 07662 (201) 587-8822.

PC-based Call-Pricer software enhanced

CCMI/McGraw Hill released enhancements to its IBM Personal Computer-based software used by businesses to compare long-distance carrier service prices.

Call-Pricer Release 3.0 uses information from a telephone bill to compare rates for intrastate and interstate calls as well as calls made within or outside of a local access and transport area. The enhancements increase call record file capacity to 2,000 calls, provide help screens and support storage of reports to disk.

Call-Pricer is offered in three levels: interstate carriers only, interstate carriers plus one intrastate carrier and interstate plus all intrastate carriers. Those requesting updates can receive them monthly or quarterly.

Prices range from $295 to $1,295, depending on the level and

Is a private
network
from N.E.T.
a competitive
advantage?

Products & Services

update option.

CCMI/McGraw-Hill, 50 S. Franklin Tnpk., Ramsey, N.J. 07446 (201) 825-3311.

Microcom releases modem network controller

Microcom, Inc. introduced a network control unit for use with its High Density Modem System (HDMS).

The Intelligent Network Controller connects the 32-modem HDMS to a terminal over either an RS-232 or dial-up link. It provides a virtual terminal control function that allows central site operators to monitor modem network status, review line and modem utilization data and run diagnostic tests on remote modems. The Intelligent Network Controller stores and maintains continuous records of system usage, including system configuration information. It also tracks modem operation statistics, including call duration and protocol use.

The Intelligent Network Controller costs $1,499.

Microcom, Inc., 1400 Providence Highway, Norwood, Mass. 02062 (617) 762-9310.

Leased-line modem features dial backup

Anderson Jacobson, Inc. announced a leased-line 9.6K bit/sec fast-poll modem featuring automatic dial backup.

For use in point-to-point or point-to-multipoint networks, the synchronous **AJ 9601-FD** operates in full-duplex over 4-wire unconditioned leased lines with fallback speeds of 7.2K bit/sec and 4.8K bit/sec. The modem features an automatic adaptive equalizer. It will monitor the receive and send line signals, and perform local analog loop-back as well as remote digital and analog loop-back tests.

The AJ 9601-FD is $2,295.

Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, Calif. 95131 (800) 423-6035.

NSA enhances AdaptSNA 3270 emulation package

Network Software Associates, Inc. released an enhanced version of its IBM Personal Computer-based IBM 3270 terminal emulation package.

The **Advanced AdaptSNA 3270,** also called AdaptSNA Version 3, makes the Personal Computer appear to an IBM VTAM/TCM host as an IBM 3278 or 3279 terminal attached to an IBM 3274 terminal controller.

The package also supports two IBM 3287 printer sessions in a Systems Network Architecture environment.

The advanced package supports text or binary file transfers, a toggle key between emulation and personal computer applications, up to three concurrent host sessions, print spooling and programmable keys.

Priced at $585, the Advanced AdaptSNA 3270 package requires the use of PC-DOS Release 2.0 or above, 196K of random-access memory, a Synchronous Data Link Control adapter and a synchronous modem operating at speeds up to 19.2K bit/sec.

Network Software Associates, Inc., 22982 Mill Creek, Laguna Hills, Calif. 92653 (714) 768-4013.

NI10/G from **page 25**

feeds a multiplexed signal to a front-end processor.

In a Burroughs environment, the gateways connect Burroughs ET1100, MT980 or TD830 terminals to Burroughs B874, CP3680 or CP2000 front-end processors. The gateway uses a synchronous link supporting Burroughs' asynchronous or synchronous poll select protocols.

In a Sperry environment, a pair of gateways connect Sperry UTS20 or DCT1000 terminals to Sperry DCP/10, DCP/20 and DCP/30 front-end processors or a Sperry Group Controller Secondary. The Sperry versions support Sperry's binary synchronous communications Uniscope poll select protocols.

According to Applitek, the gateway can be configured for master/slave operation and will respond to Applitek's Network Manager package, which allows users to control and configure the gateway from a remote location.

A 64-port NI10/G configuration connecting Burroughs terminals to a Burroughs host or Sperry terminals to a Sperry host lists for $38,000. A NI10/G linking 64 server-attached asynchronous terminals to either a Burroughs or Sperry host is currently priced at $22,500.

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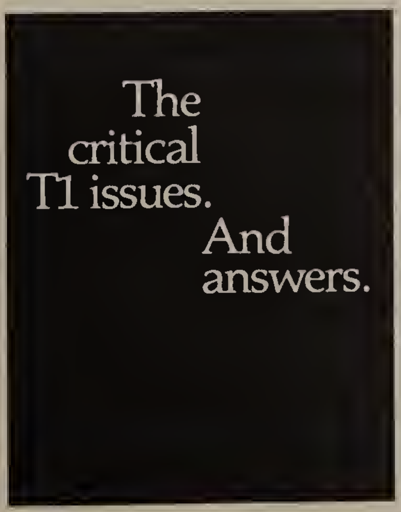

NETWORK EQUIPMENT TECHNOLOGIES

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Network Equipment Technologies has applied for a trademark for Network Equipment Technologies.
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LOCAL LOOP TECHNOLOGY

GEORGE HAWLEY

Fiber optics comes full circle

Fiber optics and large-scale integrated circuits have revolutionized telecommunications in the past few years. But this revolution has been, by and large, invisible to the average telephone user.

Most customers probably don't know or care that somewhere along the line their voices are transformed into digitally encoded pulses of light and shot through tiny strands of glass. As long as everything comes out right on the other end, there isn't any reason for users to pay attention to the technology between them and the person, or computer, they're calling.

However, this invisible technological revolution is about to step out of the closet. As fiber-optic cables finally appear in the last few kilometers of the local loop — passing the user's home — things will happen that won't go unnoticed.

An end-to-end fiber network will be completely digitized, meaning users will be presented with an abundance of integrated voice, data and video services. The question is when that will happen.

Some experts predict that fiber will appear throughout some local loops as early as 1988. The determinants will be economic factors, the same ones that spurred the deployment of fiber for long-haul applications. Fiber requires fewer repeater sites than any other technology and offers greater bandwidth, higher reliability, better security and increased resistance to electrical interference.

Accordingly, local operating companies have introduced fiber to their high-volume intercity and interoffice trunk routes. And as the per-channel cost of fiber and digital terminal equipment has declined, fiber cables have begun to appear in the feeder part of local loops. That is, they are one step closer to the user. The last step will be the installation of fiber in loop distribution to the user's premises.

> Some experts predict that fiber will appear throughout some local loops as early as 1988.

The development that has done the most to make fiber optics ubiquitous in the telecommunications industry is the replacement of multimode fiber by the newer and vastly more promising single-mode type.

In only a few years, single-mode fiber has become predominant in all parts of telephone company networks. This transition is the result of single-mode fiber's superior bandwidth and attenuation characteristics triumphing over the conveniences of handling offered by multimode's larger core diameter.

Hawley is division manager at Bell Communications Research, Inc. in Livingston, N.J.

Also, with the maturation of the manufacturing process, the cost of single-mode fiber has dropped below that of multimode.

But these developments wouldn't mean much, were it not for the concurrent advance of solid-state laser diodes as light sources for single-mode fibers. Lasers, which emit a flat, elliptical beam of high-power light over a relatively narrow band of wavelengths, allow the efficient coupling of optical power into the tiny 8-micrometer core of a single-mode fiber. Laser signals have been propagated through single-mode fiber at rates ranging into the gigabits per second for distances greater than 100 kilometers without using a repeater. That's almost 1,000 times the capacity of multimode fiber.

And there's more to come. Bell Communications Research, Inc. (BELLCORE) and other research labs are working with new distributed feedback lasers that cut the spectrum of light output to much less than a nanometer, supporting gigabit/sec transmission over longer distances.

Another recent development, gallium arsenide-based integrated circuits, can switch more than 10 times faster than the fastest silicon circuits and are also beginning to be used in digital terminals. Along with present state-of-the-art single-mode fiber, which is optimized for transmission at 1,300 nm, advances in gallium arsenide circuits and distributed feedback lasers will further boost transmission capacity in the next few years.

Even more promising are research lab prototypes of optoelectronic and photonic devices. These suggest a possible explosion in the capacity of single-mode fibers, an expansion that is orders of magnitude beyond any produced by merely increasing direct-modulated laser bit streams.

With this cornucopia of emerging technologies, the questions for telephone companies concerning the use of optical fiber in the distribution plant — between the central office and customer — may be boiled down to three: What network architecture and technology is best for this purpose; what services will customers buy beyond plain old telephone service to help pay for the fiber; and when will it make sense to install fiber everywhere? These are difficult questions because the technology is moving fast. Last year's research project becomes this year's product and next year's dinosaur.

For example, in 1985, BELLCORE demonstrated that inexpensive and reliable LEDs could be used in lieu of lasers to transmit at 560M bit/sec through single-mode fibers over more than 10 kilometers. Those results established LEDs as a possible local-loop light source.

This year, BELLCORE scientists have proposed a packaging method that reduces the cost of lasers to the range of LEDs. If lasers, with their higher performance, can be reliably provided at a cost comparable to that of LEDs, the usefulness of LEDs could be eclipsed. Also emerging are new choices in network architecture. One of these is asynchronous, high-speed packet-oriented metropolitan-area networks that link customers with a ring topology.

Another choice is synchronous optical networks (SONET) that create a standard digital hierarchy of optical signals at multiples of about 50M bit/sec. SONET bit streams are precisely formatted to allow individual 1.5M bit/sec signals to be extracted. Each approach will eventually support combinations of voice, data, image and video capabilities, although different terminal equipment designs will be required, at least initially.

The capability to transmit hundreds of megabits per second enables telephone companies not only to aggregate plain old telephone service and business services today, but presents the prospect of undreamed-of broadband services in the future.

When it becomes economical to provide basic telephone service over optical fiber, it will make even more sense to distribute cable television service, corporate video and plain old telephone service together over one net.

The efficiencies of maintaining and operating a single digital network, instead of parallel analog networks, will be compelling. Moreover, the use of digital transport on fiber offers the prospect of improved video signal-to-noise performance and high-definition TV channels, in addition to conventional format TV pictures.

As a result, CATV operators could share the benefits of fiber in the local loop.

In order for such services to be offered across local access and transport areas in the U.S., or for them to be interchanged with other countries, standard signal formats and detailed descriptions of network interfaces will be required.

Work has already begun in the Exchange Carriers Standards Association's T-1 Committee, the American Standards Forum and the Consultative Committee on International Telephony and Telegraphy to establish broadband signal standards. The work is grouped under the heading of broadband Integrated Services Digital Network, or BISDN, which will be the watchword of the telecommunications industry in the next decade.

BELLCORE research scientists and engineers have begun working on BISDN, SONET and metropolitan-area net interface standards. Experimental and prototype network applications, which are in various stages of progress, are aimed at better understanding the concepts and technologies described here.

These efforts will lead to future contributions by BELLCORE toward the establishment of technical standards and the development of technology to meet Bell operating company network equipment needs.

Confronted by rapidly changing technology, choices of possible service offerings and network requirements, and alternatives of packet and circuit transport, BELLCORE must help the BOCs sort out their options and tailor the use of optical fiber to the needs of their customers.

There is no question that these efforts will bring optical fiber to the local loop. However, it remains to be seen when users will be ready for it and what combination of technology will make it happen.

Opinions

THE ISSUE

Are VSATs a viable bypass alternative for two-way data traffic?

TOM BARRETT

PRO:

BY EMIL YOUSSEFZADEH
Special to Network World

As a bypass alternative for interactive data transfer, today's very small aperture terminal technology is a strong contender. VSAT-based data communications systems are currently being installed at a rapid pace by several major data communications users.

Retailers like K mart Corp. and Sears, Roebuck and Co., financial service firms such as Prudential-Bache Securities, Inc. and Citicorp, and manufacturing companies such as Ford Motor Co. and General Motors Corp. are now testing or installing operational interactive VSAT systems.

Smaller users are also taking advantage of the new VSAT technology. Satellite Technology Management, Inc. (STM) and other vendors are providing economical access to VSAT networks for smaller users through shared use of central facilities. As a result, the number of VSAT installations will grow rapidly in the months ahead.

Most VSAT systems are well-suited for transporting low-speed, transaction-oriented data. The newer systems, such as STM's Starmux, not only do a good job with low-speed data but also provide economical and efficient transfer of bulk files. Starmux, for example, provides a reserve pool of transponder capacity to be shared among all authorized VSAT sites and their applications. This capability is used primarily for high-speed bulk file transfer. At the same time, each site is guaranteed a minimum capacity to assure a reasonable response time of two seconds or less for low-speed terminals.

STM's testing has shown that VSAT capacity of 100K bit/sec is more than adequate to support bulk data transfer in either direction between the VSAT hub and micro earth stations.

VSAT communications systems have evolved from a long period of technological development that included the economical mass production of two-way microwave equipment, the development of low-cost, high-performance antennas and the practical implementation of highly complex error correction circuits. These systems also depend heavily on the latest in ultrahigh-speed microprocessors to pack a substantial data processing capability in a small desktop unit.

Coincident with these major hardware developments, STM and other vendors have developed the software needed to create effective networks that put users in full control of their communications resources.

The attraction of a VSAT system is that the transmission medium, the satellite, is available for all network nodes as required. The system functions as a wide-area statistical multiplexer, and substantial bandwidths are provided on a shared basis.

In addition to their attractive performance and cost advantages, bypassing terrestrial facilities with VSATs eliminates the annoying delays of ordering traditional leased lines and tail circuits. New sites can be brought on line quickly and with a minimum of hassles. Also, existing installations can be moved quickly and easily to new locations.

Another advantage is that VSAT vendors provide an up-to-

See **PRO** page 37

Youssefzadeh is founder and president of Satellite Technology Management, Inc. in Torrance, Calif.

CON:

BY G. ALAN BALEY
Special to Network World

Users considering bypassing existing telephone company lines to provide two-way data communications circuits will not find very small aperture terminals to be a viable alternative. To be viable, VSATs would have to be profitable enough for vendors to support an ongoing business and cost-effective enough for users to overcome the risks implicit in the technology.

Neither condition exists today on a broad enough scale to support an industry, although a few existing high-cost or risk-insensitive terrestrial networks are operating.

For years, VSATs have been celebrated as the salvation of the ailing satellite communications industry, and one-way VSAT applications in video and broadcast data are certainly successful. However, the market for VSATs with two-way, or interactive, data transmission is a different story.

Currently, the author is conducting a survey of hundreds of companies that have evaluated bypass. Preliminary results show that the number of users who have fully operational large-scale VSAT systems, which are used exclusively for two-way data transfer, can be counted on one hand — and none of these are solid success stories.

One reason for this is that VSAT technology is still maturing. The fact that the technology is not fully developed is not surprising, given the enormous complexities in integrating radio frequency, digital, software, management and support systems, many of which involve new designs and programs.

Economics is the biggest obstacle to large numbers of users buying VSATs. Most users who have evaluated and declined using interactive VSATs cite the technology's long 5- to 7-year payback period. Until more rental plans are available, VSATs will be expensive and capital-intensive.

Consider a typical 500-site network, where the user installs 500 VSATs and a dedicated central earth station (CES). VSATs today cost about $10,000 installed; a CES will cost at least $2 million to install and operate for five years.

The monthly cost per site for a 3-year and 5-year amortization is shown in the table on Page 41. (In calculating amortization, a 10% cost of borrowing money is assumed.) This model makes some assumptions about costs, such as space segment transponder lease fees and maintenance, which vary by vendor and application. However, the predominant cost is always the VSAT.

Market expectations for VSAT pricing have always been unrealistically low, mainly due to overzealous hype and Equatorial Communications Co.'s posture as the low-cost provider.

Because of extremely high start-up costs, no vendor will be able to achieve profitability or find prices low enough to increase market share until production volumes in the thousands are routine. Currently, less than 2,000 interactive VSATs are operational.

Key questions are: How many users' networks today have suffi-

See **CON** page 34

Baley, a business development consultant in Pacific Grove, Calif., has worked in the VSAT industry as a marketing director and as a consultant. He is currently conducting a survey of VSAT vendors and users.

NETWORK WORLD

Features

January 19, 1987

Multitude of T-1 muxes muddles unwary managers
It's easy to become mired in the vastness of T-1 multiplexer offerings. With more than 30 T-1 multiplexers on the market, communications managers must evaluate their T-1 transmission facilities realistically. By sticking to the basics, users can avoid T-1 problems and save a bundle.
Page one.

Not just an antenna farm
Once considered to be little more than antenna farms, teleports are taking flight as a networking solution. A multivendor mishmash of voice-grade circuits, satellite uplinks and fiber optics, teleports are touted as a shopping mall of communications needs.
Page 35.

We're looking for a few good stories. *Network World* is soliciting feature articles on advanced Systems Network Architecture communications, departmental networking and interaction with vendor sales representatives.

Send proposals for user-oriented articles on these and other timely communications topics to Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

PRODUCT FOCUS: T-1 MULTIPLEX

FEATURE FOCUS

How to avoid that sinking feeling

Keeping on top of the T-1 multiplexer quicksand.

Continued from page 1

networking.

The point-to-point transmission units are the plain vanilla members of the T-1 community. Just about all T-1 multiplexers accommodate voice and data, but point-to-point units support only one active T-1 link and transmit inputs only from Point A to Point B.

The next level of multiplexer sophistication is drop and insert. These units have the hardware and software needed to establish point-to-point links with many drop points within a network. They permit communications managers to designate that certain channels, which originate at one multiplexer site in the network, will exit at other network points.

In a three-point network consisting of T-1 multiplexers in New York, Chicago and Los Angeles, for example, certain channels can be designated to be dropped from the T-1 composite in Chicago while the others continue on to Los Angeles. The insert facility of the multiplexer allows channels originating in Chicago to be inserted into the composite going to Los Angeles.

The networking multiplexer offers the most flexible communications facilities by supporting several independently targeted T-1 links that can also be configured with drop and insert.

Network multiplexers also function as switching units. They allow an entire DS-1 composite, which consists of 24 64K bit/sec channels, to be switched as a whole. Also, an individual 64K bit/sec channel, called a DS0 channel, can be extracted from one T-1 composite and placed into another.

Although the three classes of multiplexers vary with the number of T-1 links and the DS-1/DS0 handling facilities, most handle high-synchronous input data speeds.

Many also support voice quantization, the process by which analog voice inputs are converted to digital signals.

The exception is Emulex Corp.'s CS 41, a multiplexer that is designed solely for asynchronous inputs and terminates on the UNIBUS of a Digital Equipment Corp. VAX controller.

Although all products listed in the chart on page 31 support the standard 1.544M bit/sec T-1 link rate used in North America, a few also are suited for the European T-1 transmission standard that calls for a transmission rate of 2.048M bit/sec and a scheme of 32 64K bit/sec channels.

Some vendors also support T-1 rates below 1.544M bit/sec to permit their products to be used in applications where T-1 links are not

☞ See **T-1** page 32

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

RS

Vendor	Model	Application	Maximum input channels	Maximum synchronous input rate (bit/sec)	Maximum T-1 link	T-1 link speeds (bit/sec)	Framing	DACS compatibility	Drop and insert	Voice quantization	Redundant logic and power	Lowest price/ average price (in thousands of dollars)
AEG Bayly, Inc. **Ajax, Ontario**	Omniplexer	Point-to-point	128	56K	1	1.544M or 6.31M	D4	DS-1	✓	PCM, proprietary		$2/$5
Amdahl Corp. **Richardson, Texas**	Multistar II	Point-to-point	96	768K	1	56K to 2.048M	D4	DS-1		ADPCM, CVSD	Optional	$7.1/$15
	Multistar III	Point-to-point/ network	92	768K	2	1.544M or 2.048M	D4, ESF	DS-1, DSO	✓	ADPCM, CVSD	Standard	$9/$25.6
	MultiStar IV	Point-to-point/ network	900+	768K	15	1.544M	D4, ESF	DS-1, DSO	✓	ADPCM, CVSD	Standard	$33/$65
AT&T **Neptune, N.J.**	735 T-Mux	Point-to-point	128	768K	1	56K to 1.544M	D4	DS-1		PCM, ADPCM	Optional	$15/$33
Avanti Communications Corp. **Newport, R.I.**	UltraMUX 1.5	Point-to-point/ network	192	1.538M	10	48K to 1.544M	D4	DS-1	✓	PCM, ADPCM, CVSD	Optional	$12/$29
	UltraPAC	Point-to-point	32	1.538M	1	48K to 1.544M	D4			ADPCM, CVSD	Optional	$6.3/$13
Aydin Computer Systems **Horsham, Pa.**	6248A-20	Point-to-point	128	768K	1	128K to 1.544M	D4	DS-1, DSO	✓	PCM, proprietary	Optional	$10/$34
	6296	Point-to-point	120	768K	1	1.54M	D4	DS-1	✓	PCM, proprietary	Optional	$25/$65
Coastcom **Concord, Calif.**	D/I Mux	Point-to-point	24	1.538M	1	1.544M	D4	DS-1, DSO	✓	PCM		$3/$4.5
Codex Corp. **Mansfield, Mass.**	6240	Point-to-point/ network	96	1.3M	6	56K to 2.048M	D4	DS-1	✓	PCM, ADPCM	Optional	$12/$35
Datatel **Cherry Hill, N.J.**	9000 series	Point-to-point/ network	960	1.536M	10	56K, 1.544M or 2.048M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM, CVSD	Optional	$4.8/$30
Digital Communications Associates, Inc. **Alpharetta, Ga.**	Netlink	Point-to-point	128	2.048M	1	56K to 2.048M	D4	DS-1	✓	CVSD	Optional	$5/$20
Digital Communications Associates/ Cohesive Network Corp. **Los Gatos, Calif.**	System 9000	Point-to-point/ network	854	1.544M	36	1.544M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM	Optional	$17/$60
Dynatech Communications, Inc. **East Greenwich, R.I.**	Interlink	Point-to-point	128	56K	1	1.544M	D4, ESF	DS-1, DSO	✓	PCM, proprietary	Optional	$2.3/$20
Emulex Corp. **Costa Mesa, Calif.**	CS-41	Point-to-point	144	9.6 asynchronous*	1	1.544M	D4					$3.2/$3.2
General DataComm Industries, Inc. **Middlebury, Conn.**	MegaMux Plus	Point-to-point	54	1.152M	1	4.8K to 2.048M	Proprietary	DS-1	✓	PCM, SDPCM, CVSD, proprietary	Optional	$12.5/ $25
	MegaMux 2	Point-to-point/ network	448	1.152M	8	4.8K to 2.048M	Proprietary	DS-1	✓	PCM, ADPCM, CVSD, proprietary	Optional	$23/$50
Granger Associates **Santa Clara, Calif.**	CP 2000	Point-to-point/ network	120	1.538M	6	1.544M	D4, ESF	DS-1	✓	PCM, ADPCM	Optional	$8/$18
Infotron Systems Corp. **Cherry Hill, N.J.**	InfoStream 1000	Point-to-point	64	1.024M	1	1.544M	D4, ESF	DS-1, DSO		PCM, ADPCM	Optional	$7.3/$18
	InfoStream 1500	Point-to-point/ network	128	1.024M	2	1.544M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM	Optional	$9.4/$23
	InfoStream 2500	Point-to-point/ network	NA	896K	16	1.544M	D4	DS-1, DSO	✓	PCM	Optional	$64/NA
Network Equipment Technologies **Redwood City, Calif.**	IDNX 40	Point-to-point/ network	68	1.536M	15	256K, 512K, 1.544M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM, proprietary	Optional	$32/$45
	IDNX 70	Point-to-point/ network	768	1.534M	64	256K, 512K, 1.544M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM, proprietary	Optional	$41/NA
Network Switching Systems **Andover, Mass.**	160 Switch	Point-to-point/ network	160	768K	18	19.2K, 56K, 1.544M	D4, ESF	DS-1	✓	PCM, ADPCM	Optional	$70/$90
	320 Switch	Point-to-point/ network	320	768K	18	19.2K, 56K, 1.544M	D4, ESF	DS-1	✓	PCM, ADPCM	Optional	$90/$135
Paradyne Corp. **Largo, Fla.**	3210 T-1 Mux	Point-to-point	96	1.536M	3	1.544M	D4, ESF	DS-1, DSO	✓	PCM, CVSD	Optional	$7/$20
Racal-Milgo, Inc. **Sunrise, Fla.**	Omnimux T-1	Point-to-point	96	768K	1	56K to 2.048M	D4	DS-1		CVSD	Optional	$7/$20
Scitec Corp. Ltd **Newport, R.I.**	BSP T1	Point-to-point	128	1.344M	1	9.6K to 2.048M	D4	DS-1		ADPCM, CVSD	Optional	$6.4/$30
Spectrum Digital Corp. **Herndon, Va.**	DTX	Point-to-point/ network	512	1.536M	8	4.8K to 2.048M	D4	DS-1	✓	PCM	Optional	$30/$150
StrataCom, Inc. **Campbell, Calif.**	IPX	Point-to-point/ network	1,100	1.344M	50	9.6K, 56K, 1.544M	D4, ESF	DS-1, DSO	✓	PCM, ADPCM, proprietary	Optional	$10/NA
Tau-tron, Inc. **Westford, Mass.**	Intraplex D/I	Point-to-point	168	1.536M	1	300 to 1.544M	D4	DS-1, DSO	✓	PCM, CVSD	Optional	$2.7/$8
Timeplex, Inc. **Woodcliff, N.J.**	miniLINK/1	Point-to-point/ network	44	1.152M	2	4.8K to 2.048M	D4, proprietary	DS-1	Optional	PCM, ADPCM, CVSD	Optional	$9.4/$14
	LINK/1	Point-to-point/ network	208	1.152M	6	4.8K to 2.048M	D4	DS-1	✓	PCM, CVSD, ADPCM	Optional	$12/$45
	LINK/2**	Point-to-point/ network	500	1.152M	12	4.8K to 2.048M	D4, ESF	DS-1	✓	PCM, ADPCM, CVSD	Optional	$13/$70

*** Handles asynchronous data only**
**** Second link for redundancy**
ADPCM = Adaptive differential pulse code modulation
CVSD = Continously variable slope delta modulation
DACS = Digital Access and Cross-connect System
ESF = Extended superframe format
PCM = Pulse code modulation

SOURCE: TMS CORP., DEVON, PA.

T-1 from **page 30**

available or applicable, or where contingency circuits are used if the T-1 link fails.

A number of products within each of the three categories state compatibility with AT&T's Digital Access and Cross-connect System (DACS), as well as the Extended Superframe Format (ESF). DACS permits users to designate that an entire DS-1 or individual DS0 channels can be switched around the DACS-controlled network.

DACS consists of central controllers located at AT&T facilities in Netcong, N.J. Each controller terminates up to 128 DS-1 composites, one of which is used for control purposes. The remaining 127 terminations can be cross-connected into other DS-1s going to user-designated locations.

Not every T-1 multiplexer is compatible with AT&T's DACS at the DS0 level, but those that are use 8-bit words and channelize data on 64K bit/sec boundaries. ESF is now being implemented on AT&T carrier facilities and provides facilities for monitoring transmissions and correcting data errors.

There is a fair amount of misunderstanding about DACS compatibility with T-1 multiplexers, according to Tim Zerbiec, vice-president of technology for Vertical Systems, Inc., a communications consulting firm located in Dedham, Mass.

"Products that use D4 framing and formatting can be DACS-compatible provided that the T-1 multiplexer can accept loop timing and distribute individual DS0 channels locally. That permits a DACS composite to be sent to the T-1 multiplexer for local distribution. Therefore, a lot of products that are not DACS-compatible on the composite side can be compatible on the receive channel side," Zerbiec says.

The voice quantization techniques that are used by a majority of T-1 multiplexer vendors are pulse code modulation (PCM), adaptive differential PCM (ADPCM) and continuously variable slope delta (CVSD).

All three techniques divide the 4 kHz voice input into 8-bit words but differ in the number of bits per second required to digitize them. PCM needs 64K bit/sec, while ADPCM and CVSD require only 32K bit/sec each. Some vendors use proprietary schemes to reproduce ADPCM and CVSD at 16K and 24K bit/sec.

A prime reason for using a T-1 multiplexer is to save on the number of voice/data lines needed. To that end, they are effective.

"I'd say we saved at least $10,000 a month by going to T-1," says Lee Dorris, network manager for Hughes Tool Co. in Houston. Dorris is using a Racal-Milgo, Inc. Omniplexer T-1 with CVSD — manufactured by Amdahl Corp. as MultiStar II — and has been able to fit two voice inputs into each DS0 channel, allowing Hughes to get rid of its foreign exchange lines.

Gary King, communications manager for Republic Bank in Dallas, had a similar experience. "We're using our Codex Corp. 6240 for voice and data, and we were able to get rid of a number of voice/data lines with no degradation of service."

Unfortunately, not everyone interviewed was so satisfied with the voice facilities they tested. One network manager tried an ADPCM card from a well-known T-1 multiplexer vendor and experienced an inordinate number of errors when running data at 2,400 bit/sec.

"That's not surprising at all," says Ron Foster, customer premises equipment division administrator at Granger Associates in Santa Clara, Calif. "The ADPCM implementation varies [among vendors]. The early Consultative Committee on International Telephony and Telegraphy ADPCM recommendation had a problem with low-speed [frequency-shift keyed] modems and caused errors. Many vendors, therefore, resorted to their own designs."

According to Vertical Systems' Zerbiec, "Some vendors use very sophisticated voice encoding schemes that provide excellent data and voice, and can easily be adapted to changing standards. Other vendors have done a poor job with ADPCM, and customers end up on the short end."

Bob Dayton, president of Dayton Associates, a communications consulting firm in Flemington, N.J., says that AT&T's DACS might be the right choice for certain types of users. "DACS is certainly a good deal for those needing a switching capability but not wanting to be involved with managing an entire network.

"Of course, the user does have to relinquish some control when using DACS." Specifically, that control is channel handling and system supervision.

According to Tench Coxe, who heads the Netlink and Cohesive T-1 product management functions for Digital Communications Associates, Inc., "Many people want to control their entire networks end to end to the channel level, and they want the ability to reconfigure easily."

"With DACS, you don't have that level of control, and it takes 15 to 30 minutes to get a reconfiguration into effect," Coxe says. Ac-

96
Toll-Quality
Channels
on a
T-1

Sound unbelievable? Not when the multiplexer is the Aydin Model 6296. This packetized voice/data multiplexer provides an unprecedented **4:1 compression advantage** over conventional 64 Kb PCM. By combining 32 Kbps encoding and Digital Speech Interpolation, Aydin's 6296 multiplexer can concentrate **96 toll-quality voice channels** on a single T-1 circuit. Any voice circuit supports **9600 bps** in-band data.

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AYDIN MONITOR Systems

cording to AT&T, that time requirement is accurate.

"Control is a very important consideration with our customers," says Tim Smith, T-1 product manager for Timeplex, Inc. in Woodcliff Lake, N.J. Doug Antaya, T-1 product manager for Codex, agrees. "Companies used to central net control don't like the idea of passing it off to AT&T or anyone else."

If DACS doesn't provide the desired control, and sophisticated networking multiplexers that do DS-1 or DS0 cross-connects can't be justified, how about drop and insert? Apparently, using that configuration is not as simple as it looks in the vendor literature.

One user at a national service organization combined private and public carrier facilities and experienced a number of synchronization problems. "His problem was predictable," Zerbiec says. "Different carriers have slightly different timing references. They aren't extreme, but occasionally a T-1 frame slip occurs, and the mux has to resync. During that time, data is lost," he says.

T-1 multiplexers can save a bundle by eliminating lines, and they can do a fine job handling voice and data, provided managers don't try anything too fancy.

If a user's requirements call for drop and insert, there are products that can handle frame slippage. If prospective vendors claim to have mastered the problem, make them prove it. ☑

▶T-1 PROBLEMS

Timing is everything

Some T-1 multiplexer users have found, to their chagrin, that synchronization problems occur when drop-and-insert applications are attempted.

Vertical Systems, a telecommunications consulting firm in Dedham, Mass., has encountered those problems "more frequently than we'd like," says Tim Zerbiec, the firm's vice-president of technology.

Zerbiec has a few tips to help communications managers avoid some migraine headaches:

The big problem with implementing drop-and-insert is finding a multiplexer that can tolerate T-1 message-frame slipping. That happens when the carrier timing reference deviates from its norm and causes the multiplexer to lose frame synchronization. When that happens, it can take 20 frames or more to resynchronize, during which time every single bit of data is lost. That can add up, considering that one frame equals 192 data bits and 1 framing bit.

Another situation in which frame synchronization is critical is when there are many carriers. Carriers use slightly different timing references, and frame slipping will occur over hours of operation. Even using the same carrier for everything will not guarantee a slip-free environment because the clocks governing timing throughout the network differ in their levels of accuracy.

Guarding against slippage

How does one guard against slippage? Ask the carrier what level of service, or slip rate, it will guarantee. This will be stated in terms of one T-1 frame over a certain number of hours of operation.

"Be careful of those numbers," says Roger Blanton, product manager for T-1 multiplexers for Paradyne Corp. in Largo, Fla. "AT&T will quote users a certain level of error for its T-1 service but will demand a much more stringent level of error from the T-1 line it buys from local telephone companies. Therefore, find out who's supplying what."

In any event, have the T-1 multiplexer vendor review the error-rate specifications to ensure that its product can provide satisfactory service under "worst-case" conditions. If it's possible, have the vendor run a test where synchronization problems are induced.

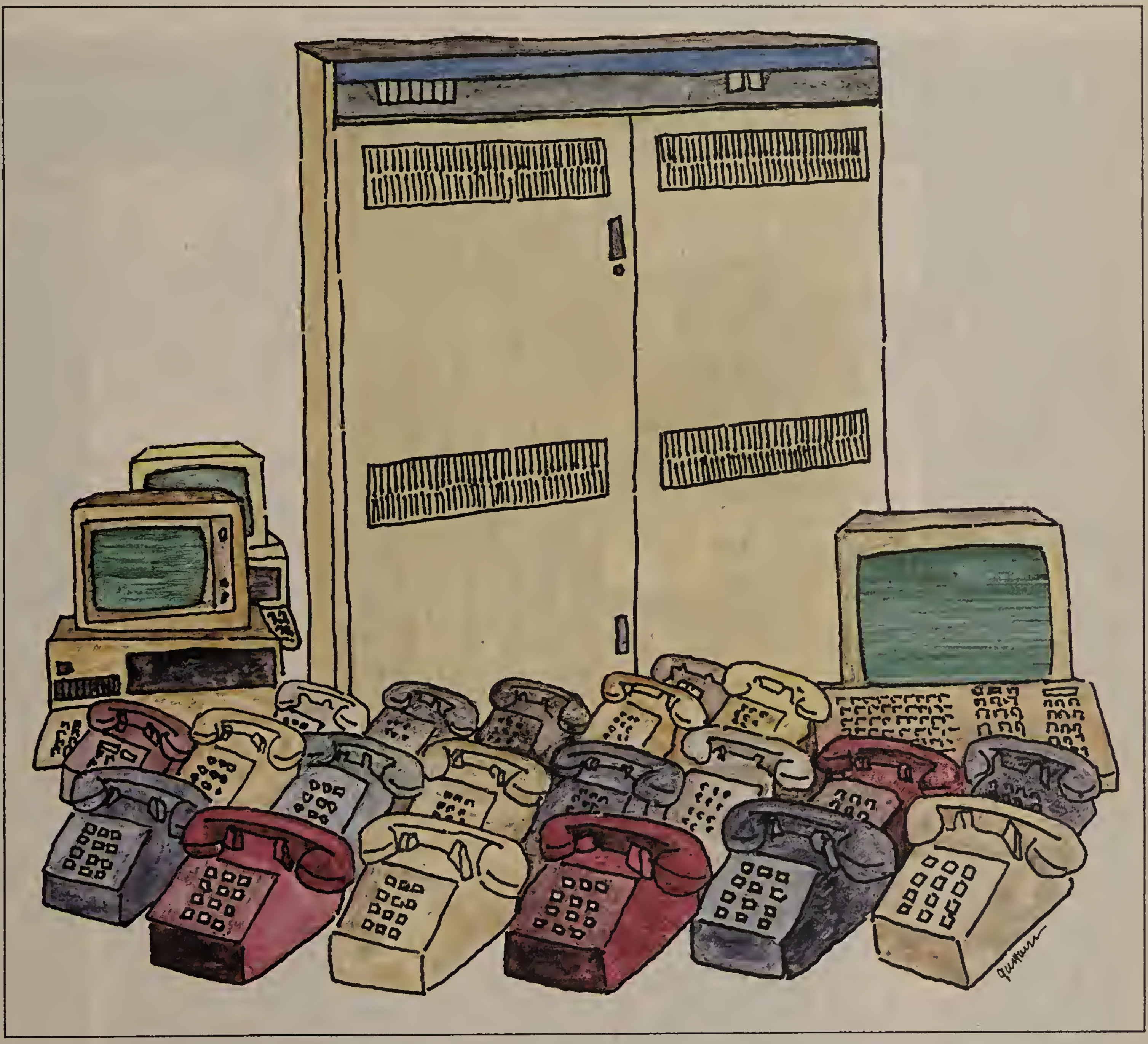
Data handling is vital

Although voice reproduction is an important consideration, the ability to handle data is also vital, especially if dial-in applications are to be supported.

Ask the vendor the following questions: What signaling is passed, such as push button? What types of modems are supported? What transmission speeds will they guarantee? What types and speeds of facsimile transmission are supported?

As for adaptive differential pulse code modulation, the only way to be sure is to test it under actual or simulated operating conditions. Vendors should be able to simulate line impairments and should demonstrate their products under these conditions.

— John J. Hunter



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ciently high per-site costs to justify the costs and risks of implementing interactive VSATs, and how big are such networks? The answers are not encouraging.

Large users tend to have lower average costs per site than small users because they have more intra-local access and transport area network alternatives with which to mitigate the effects of private-line tariff increases.

Cost of supporting a 500-site VSAT network

	Cost	Monthly cost/VSAT: 3-year amortization	Monthly cost/VSAT: 5-year amortization
VSAT	$10,000	$323	$212
Maintenance		80	80
Software support		10	10
Space segment		90	90
Central earth station	$2 million	$129	85
Total		$632	$477

However, small- and medium-sized users cannot justify a dedicated CES. As a result, a major share of the interactive VSAT bypass market may be in small- and medium-sized networks, where many small users share vendor-supplied CESs to minimize the costs of backhaul circuits.

Asking a user to scrap his telephone company-based network in favor of a new unproven alternative that carries a 5- to 7-year commitment is asking too much. Furthermore, satellite interference problems have escalated in both the C and Ku bands because of increased activity.

Transponder management is becoming the weak link in the support chain. Full system backup strategies provided by vendors are inadequate and poorly understood by users, and vendors understate backup risks.

A large, multipoint terrestrial network consists of tens or hundreds of individual circuits; no single network failure can bring the entire network down. VSAT networks, on the other hand, create several single-thread failure points — such as the satellite transponder, CES and the VSAT itself — which are prohibitively expensive to eliminate and are often out of users' control.

With a fixed lifetime, satellite failure is a certainty, and the probability of timely satellite replacement is at an all-time low due to a lack of launch capability.

The reliability of interactive VSATs is also a problem. It's common for interactive VSAT trials to be extended several times, and one major interactive VSAT user surveyed had to reset every VSAT manually once a day for months to get telephone company-level performance.

Both radio-frequency and digital electronics problems continue to thwart efforts to provide end-to-end availability equal to that of telephone lines.

Even when availability figures approach or beat those of telephone company circuits, the frequency of VSAT failures is likely to be much higher. This is primarily due to increased complexity.

Replacing relatively simple modems with complex VSAT electronics and associated software places more failure points on the network. Atmospheric, cosmic and phantom-carrier outages just add fuel to the reliability fire. Until hardware and software mature, VSAT users will see more failures of shorter duration.

This will increasingly aggravate users, who will have to invoke restart procedures and deal with auditing lost transactions more often.

In spite of recent problems with VSAT market leaders Equatorial ("More layoffs jar overbuilt Equatorial," *NW*, Nov. 3) and Telcom General Corp. ("Low sales push VSAT maker to trim forces," *NW*, Oct. 27), the future of the VSAT business is bright — but not for bypassing phone lines.

Interactive VSAT market development will be gradual but steady, and the winners will be those companies that build specialty applications which can be achieved only by using interactive VSATs. Examples might include transportable applications for users in fields such as forestry.

Finally, vendors aren't yet providing adequate network management systems. While vendors may see this as icing on the cake, for users, network management is an essential ingredient.

Most users cannot justify the use of VSATs for interactive data alone. Providing network management integration, video, video and data integration, and other value-added products and services will become increasingly necessary for successful suppliers. ☐

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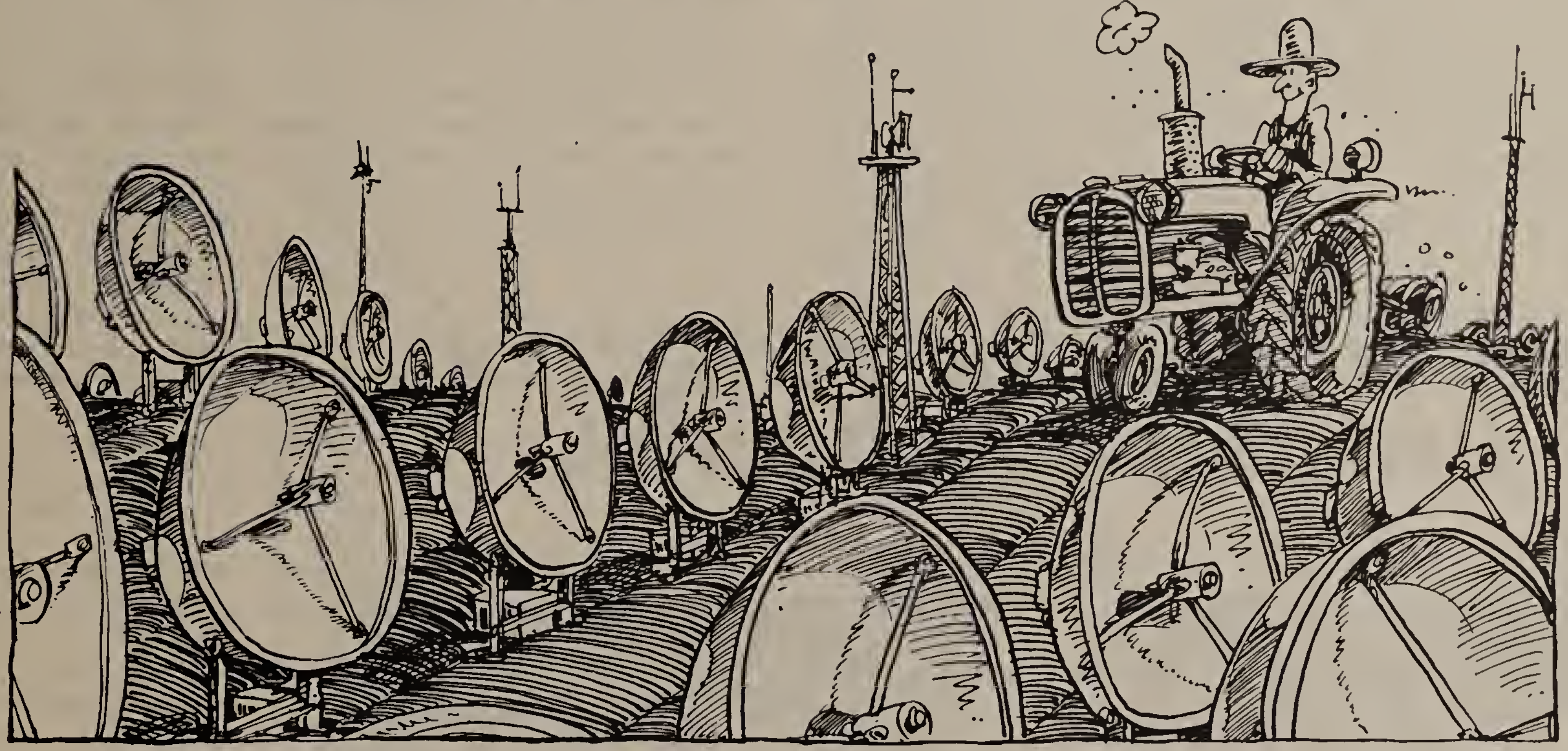

JON McINTOSH

Corporate users resort to teleports for distributing communications.

BY LYNN HABER
Special to Network World

Unlike the earliest teleports, dubbed antenna farms because they consisted primarily of satellite antenna uplinks, today's teleport is touted as a communications hub for the information age.

Teleports offer a variety of media services, including Ku-band and C-band satellite transmission capability, optical-fiber terrestrial links and T-1 voice/data transmission. Some teleports are based within commercial real estate developments that feature intelligent building facilities.

"Although I wouldn't use a teleport as a sole vendor, its services are a good alternative for users whose networks rely on a variety of carriers. Teleports offer good cost and performance; they're reliable, and they have a low bit error rate," says Robert Maire, assistant treasurer for the telecommunications division at the Banker's Trust Co. in New York.

Today, there are 28 operational teleports scattered across the U.S. and another 24 projects under development elsewhere in North America, according to Gerhard J. Hanneman, president of the Elra Group, a teleport industry research and consulting company in San Francisco. By 1989, all 52 currently documented teleports are expected to be operational.

Jerome Lucas, president of TeleStrategies, Inc., a telecommunications consulting and market research company in McLean, Va., says user demand for teleport facilities will be spurred primarily by the greater number of corporate very small aperture terminal networks. VSAT technology enables telecommunications networks to bypass local exchange carriers and interexchange carriers completely by transmitting and receiving data interactively via small-diameter antennas of 2.4 meters or less.

Lucas estimates that by 1991, there will be 200 shared-hub earth stations in the U.S. Hub facilities are necessary to do polling and high-speed data transmission to remote VSAT sites. The Federal Communications Commission's blanket authorization in October 1986, allowing construction of multiple-site Ku-band VSAT networks, will provide a big boost to market growth, according to Lucas.

Other factors that will contribute to an increase in teleport use, according to Hanneman, will be increased public awareness of teleport services, competitive rate structures as more telecommunications providers enter the market, more variety in teleport services and an increase in digital services.

Hanneman estimates that teleport traffic, which today carries 75% video, 15% voice and 10% data, will shift so that by 1992, 50% of teleport traffic will be video, 30% voice and 20% data.

The evolution of teleports in the U.S. is tied to the growth of the cable television industry and its multipoint satellite distribution facilities. This growth, fueled by the breakup of AT&T and the resulting competition among independent long-distance carriers, spurred the leasing of satellite facilities as inexpensive interexchange trunks.

One of the largest teleport projects is The Teleport, a 350-acre office park on Staten Island, N.Y. The Teleport is a $22.5 million public and private venture of the Port Authority of New York and New Jersey, Merrill Lynch & Company, Inc. and Western Union Corp. Teleport Communications Co., the organization that handles the telecommunications side of the project, began operation in April 1985.

Since 1985, Teleport Communications has accrued 37 customers that currently use two gigabytes of satellite bandwidth capacity, equivalent to more than 30,000 voice-grade circuits, says Robert Annunziata, president of the firm. The company's customers include Bankers Trust, Merrill Lynch, the Securities Industry Automation Corp., Comsat International Communications, Inc. and Dow Jones &

☞ See **Teleports** page 36

Haber is a Boston-based freelance business writer.

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Company, Inc.

The Teleport's telecommunications services include satellite uplink facilities and a 150-mile fiber-optic network covering Manhattan's business district and extending into Brooklyn, Queens and Staten Island in New York, and Jersey City, Newark, North Brunswick and Princeton in New Jersey.

Norman Smith, national communications manager for Dow Jones in Princeton, says his company switched in January 1986 from leased public telephone network facilities to a dedicated fiber-optic link supplied by The Teleport because it offered virtually unlimited bandwidth and lower cost.

"Based on the small number of circuits we initially got, we figured that we'd see a 2-year payback period. But since January, we've already increased our facilities by 75%," he says.

The real estate angle

September 1986 marked the completion of the 56,000-square-foot Telecenter, which functions as a control center for Teleport Communications facilities, and the Teleport 1, a three-story, 112,000-square-foot office building. Nomura Securities Co. Ltd., a large Japanese securities and investment banking firm, and the Port Authority will occupy the Telecenter, and the Catholic Telecommunications Network of America is the first tenant for the Teleport 1 building.

Annunziata says that although the real estate portion of the teleport project complements the telecommunications facility, "the real estate part takes longer to get going" because it's difficult to get an immediate commitment from tenants. However, the failure of one does not signal the downfall of the other, because each is a separate business, he claims.

Dennis Elliot, executive vice-president of Pacific Telecom, Inc., a 50% partner in the Bay Area Teleport (BAT) in San Francisco, says the communications facility must stand on its own.

"The facility will not rise or fall because of the real estate. But the real estate can get some benefits from being aligned with a complex communications project," he says.

Although the real estate-based projects are more visible and have gained more publicity than their counterparts, Hanneman reports that only 4% of all teleports are actually related to real estate.

A variation of the real estate-based teleport is one that is user-specific or investor-specific, according to Hanneman. The New York Teleport is classified as user-specific because its primary user is Merrill Lynch, also a major player in that venture. Conversely, BAT relies on an assortment of users.

Alternative channel

Annunziata likens today's teleports to the seaports and airports that serve as distribution points for the raw materials and finished goods of manufacturing-based economies. "We consider teleport communications a high-quality economic alternative to the local distribution companies," says Annunziata.

Bankers Trust's Maire agrees. An original teleport customer in April 1985, Bankers Trust started with four T-1 lines for heavy data traffic and some voice traffic between two of the company's data centers, one located in New York and the other in New Jersey. The company also uses teleport services for tail-end circuits, or last-mile access.

"I believe that The Teleport helped drive down the price of communications in New York," he says. When he was shopping for a vendor, Maire says, Teleport Communications quoted him a price that was half of what Manhattan Cable would have charged for similar service.

At that time, he says, Manhattan wanted $1,800 per month for a T-1 line on a broadband network. Now, he claims, that price has dropped to $1,000 because of competition. Maire says he wanted to bypass New York Telephone Co. because its circuits were inferior, more expensive and would have taken months to install.

"To establish a link between our Jersey City facility and our Manhattan facility, we would have had to use three vendors: New York Telephone and New Jersey Bell for the circuit, and Nynex Corp. for the circuit termination equipment," he explains.

"And in a situation like that when something goes wrong, you get a lot of finger-pointing as to where the blame lies. Using The Teleport, one vendor handles everything."

Conjuring up connections

The majority of existing teleports are stand-alone operations. Usually, they are centralized sites where communications equipment connects to the space segment and to local terrestrial networks for interactive transmission capabilities in a specific region. These facilities are mostly analog, and the bulk of service they provide is to the cable television and broadcast television industries.

Two examples of stand-alone facilities are the 5-year-old Washing-

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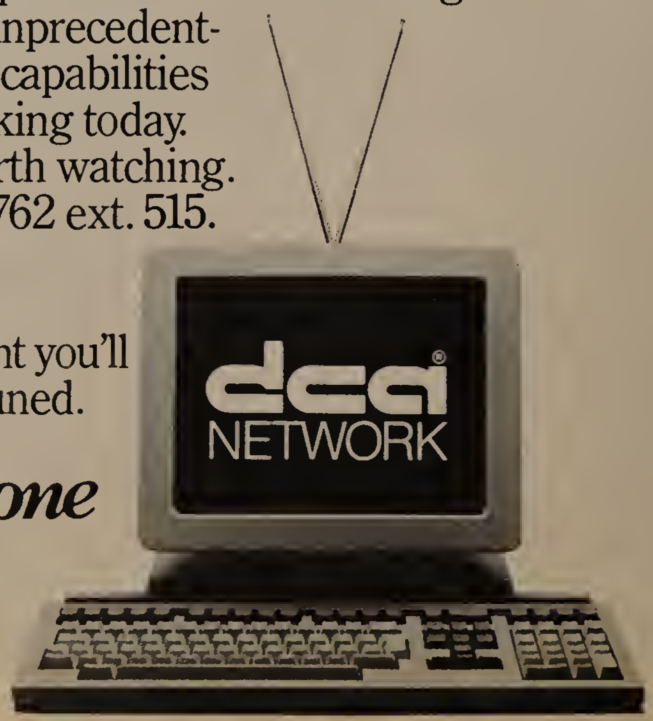

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ton, D.C. International Teleport and the 3-year-old Atlanta Teleport. The Washington, D.C. teleport got its start as a satellite gateway with a microwave loop that is currently moving to fiber optics. The Atlanta facility has C-band and Ku-band satellite transmission capability as well as microwave. Both serve the broadcasting industry and private companies.

Hanneman expects the forthcoming generation of teleports to offer primarily digital facilities or to provide hybrid forms of analog-to-digital and digital-to-analog conversion to connect Integrated Services Digital Networks with the embedded local exchange analog plant. Given the uncertainty about future changes in U.S. local exchange access policies, Hanneman contends that the most viable teleports will be those with proprietary means of connectivity.

The Teleport has worked out an agreement with New Jersey Bell for shared-line usage and is negotiating, albeit unsuccessfully so far, with New York Telephone to work out a similar agreement.

Projected growth inaccurate

During the late 1970s and early 1980s, teleports were among the hottest topics around. Today, however, industry analysts recognize that the projected growth estimates for satellite data communications were inaccurate. "The demand expected about five years ago for satellite transmission of data didn't materialize," says David Rubin, senior telecommunications consultant at Arthur D. Little, Inc., a research and consulting company based in Cambridge, Mass.

Instead, large corporations with heavy voice/data requirements invested in private terrestrial or microwave networks. In business, where information is viewed as a strategic weapon, network reliability is of paramount importance.

Last-mile access

Last-mile access from a trunking facility to the end user's facility is still an open issue for teleport providers. Use of CATV networks for last-mile access looks like a good bet because they are so prevalent, Hanneman says. However, he adds, CATV is missing data transmission business opportunities because its management is picture-oriented, not telecommunications-oriented.

Additionally, migrating corporate America over to the teleport concept is a slow process. "It takes a lot of resources and proven technology to get large corporate customers to switch their operations," Hanneman says. "Most corporate telecommunication managers are heavily involved with established common carriers, who to them are a no-risk situation even if it means paying two or three times more for a circuit."

For potential users of satellite transmission who demand network security (whereas optical fiber media is not easily tapped, it is often possible to listen in on a satellite transmission), many teleport vendors offer encryption capability as a value-added service.

Satellite transmissions are also vulnerable to jamming. In the celebrated Captain Midnight incident, a single individual was able to swamp a Home Box Office signal. But, Hanneman observes, "Some kook can also cut optical fiber or knock down a microwave tower."

Arthur D. Little's Rubin, like many industry observers, says that teleports are here to stay. "They're a rich idea, and I think we'll see them in a variety of forms," he says. "But that doesn't mean we won't see some projects fail. In the end, though, teleports will have a permanent effect on the commercial marketplace."

PRO from **page 29**

date, all-digital facility with advanced management and diagnostic tools. Consequently, users have a single contact with true end-to-end responsibility.

As a rule, VSAT networks with between 20 and 100 sites can be very economical when supported by a shared central hub. Larger networks are usually served with a dedicated hub facility located at the customer's headquarters.

Installing a private, 100-site VSAT network involves a capital expenditure of approximately $2 million. Half of this amount is for the hub station and the other half is for 100 micro earth stations, which are small enough to fit on a rooftop. Costs for the satellite channel depend solely on the required capacity and not on the distances separating the sites.

Channel costs for the network described above would range from about $5,000 per month for a 10K bit/sec capacity through a shared hub to $40,000 per month for a 500K bit/sec capacity through a private hub.

These channel capacities are available to all VSAT sites, each of which can support several terminals and other devices. The capacity available to each site is fully controlled by network software to maintain effective performance for all users.

Compared with the cost of maintaining comparable terrestrial lines, VSATs have a decisive advantage. In terms of cost, performance, convenience and control, VSATs are proving the best solution for many new networks.

Letters

IBM staff changes

Your story, "10,000 IBMers retiring," (*NW*, Dec. 22) contains inaccurate information about IBM. The story alleges that IBM is planning layoffs in an effort to slash spending. This is simply not true. In keeping with our full employment tradition, IBM has not laid off any employees and has no plan to do so.

Peter F. Judice
Director of information
IBM

Ed. reply: Network World *regrets the use of the term layoff to describe IBM's work-force reduction efforts. The company maintains a no-layoff policy.*

Infotron's T-1 commitment

The article, "Infotron girds for big losses," (*NW*, Dec. 15) includes an interview with David Barnhill, vice-president of finance for Infotron Systems Corp. Some of his comments were seriously misinterpreted, leading to unfounded and damaging conclusions regarding Infotron's commitment to the T-1 market.

Your reporter was told that some laggard products will be cut from Infotron's product line, and this was quoted. The following sentence says that the InfoStream T-1 multiplexer has not sold as well as expected — a fact completely unrelated to our trimming of the product line.

The insinuation that the InfoStream product line may be dropped is completely untrue and has created confusion and uncertainty among our customers. The press release on which the interview was based states that these cuts were related to certain low-volume OEM products only.

Infotron is committed to the T-1 marketplace and does not intend to stop making, marketing or servicing the InfoStream product line. We are continuing to expand our role and commitment to this market.

James C. Hahn
President and chief executive officer
Infotron Systems Corp.

Ed. reply: Network World *did not imply that Infotron was preparing to drop the InfoStream multiplexer. It simply restated Barnhill's comments. During the interview, he said: "The T-1 InfoStream product hasn't ramped up as fast as we would have liked. We will probably consolidate some product lines. We need to put emphasis on products that are selling well and that may mean cutting out the laggards in our product line."*

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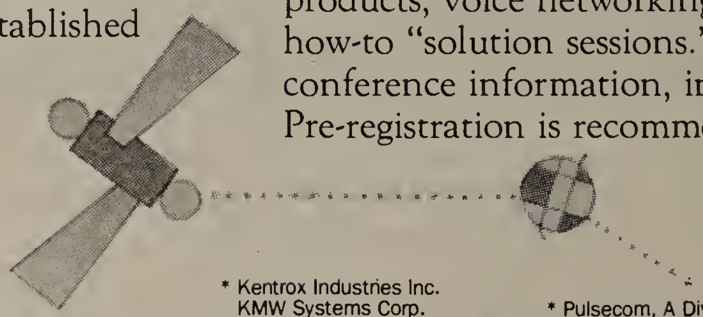

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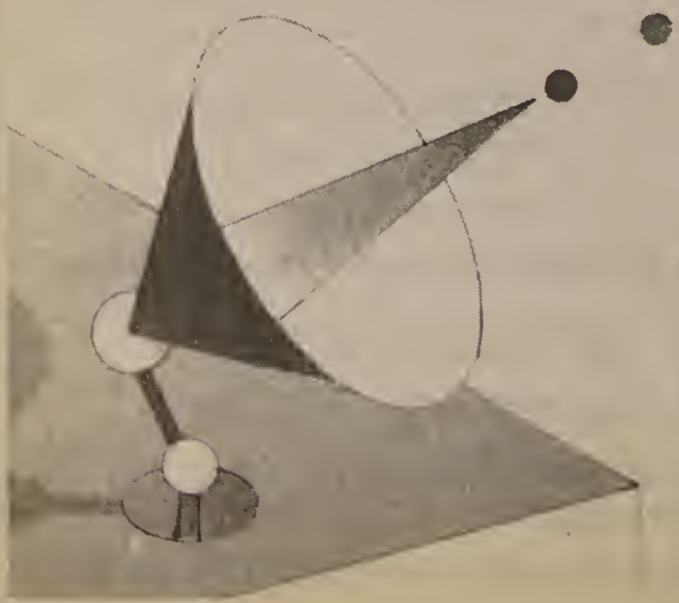

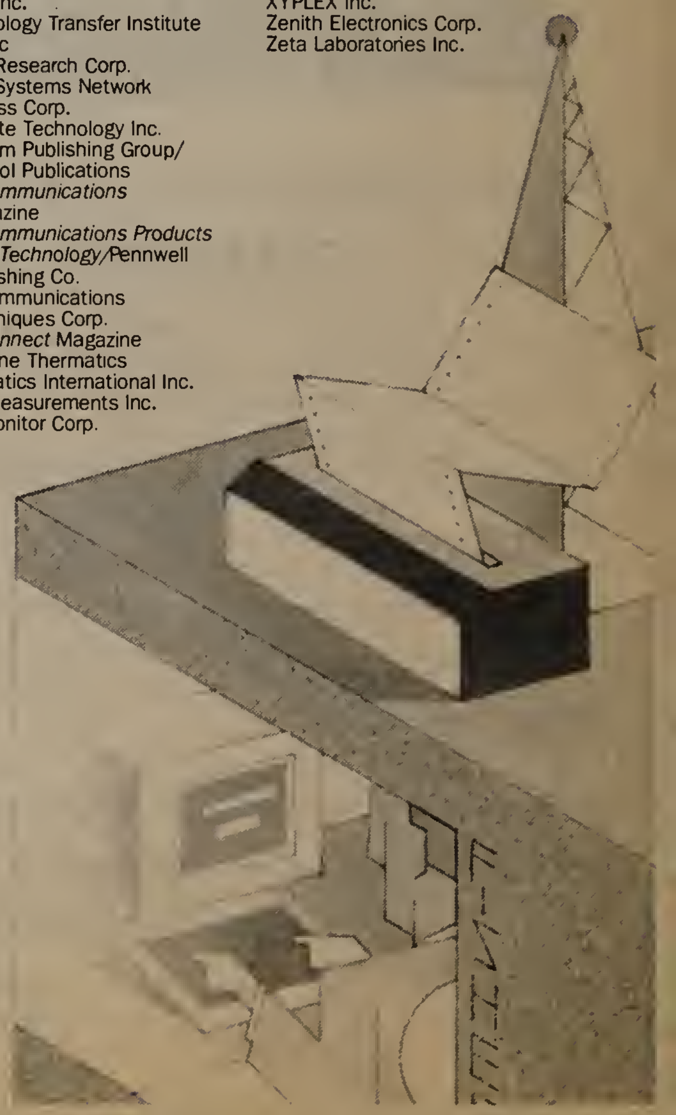

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T-1 from **page 2**

links needed to access the service at both ends of the circuit, or incur the costs of bypassing the local carriers. In most cases, AT&T bills the user for the local portion of T-1 service. The proposed AT&T tariff revisions do not affect the cost of local access charges for T-1 service.

One of the factors behind AT&T's T-1 rate reductions, according to tariff expert Robert Ellis, is price competition fueled by the increased availability of T-1 services made possible by the growth of fiber-optic facilities. "Carriers are looking to sell fiber-optic capacity as T-1 channels," said Ellis, president of The Aries Group, a Rockville, Md., consulting company. "If I were a user, I would take a good look at their offerings."

Another reason for AT&T's T-1 rate restructure, according to Ellis, is the carrier's increased understanding of the cost factors involved in determining T-1 rates. When AT&T first introduced T-1 service for end users three years ago, there were only 800 T-1 circuits in the country. Now, according to Ellis, AT&T has 8,000 circuits and a better idea of the costs involved in providing the service.

Ellis said the falling T-1 prices are an incentive for users to combine voice and data traffic to come up with enough capacity to justify a T-1 circuit.

"Let's say a user doesn't have enough voice traffic to justify a T-1 line, even under the new rates," Ellis said. "But then he finds out that the data guys have a 56K bit/sec multiplexer next to his voice network node in Los Angeles going to a data center in New York. By running the 56K bit/sec traffic over the T-1 line, he can save the $10,000 cost of a 56K digital data circuit."

Jerry Harder, tariff specialist at Telco Research in Nashville, agreed that the proposed T-1 tariffs would give users an added incentive to combine voice and data to take advantage of the high-capacity service. In addition, Harder said that, generally, under the new AT&T T-1 rates, users with five 56K bit/sec data lines could justify the cost of a 100-mile T-1 circuit. Users with six 1,000-mile long data lines would save money by changing to a T-1 circuit, while a 3,000-mile T-1 circuit would offset the cost of eight 56K bit/sec Dataphone Digital Service lines.

Users with 16 100-mile voice-grade analog private lines would save money by replacing them with a single T-1 link. A 500-mile T-1 circuit would offset the cost of 19 voice-grade private lines, while at 1,000 and 3,000 miles, users with 24 and 35 private lines, respectively, would realize a savings by employing T-1 circuits, Harder said.

Reseller from **page 2**

fered by MCI, US Sprint and others is more inviting than paying the full AT&T WATS rate and is cheaper than the old WATS rate.

Tom Gibson, deputy director of the Washington, D.C.-based Competitive Telecommunications Association (CTA), said his group pleaded with the Federal Communications Commission for an extension of the AT&T WATS Business Line Pro Rate. "We said we needed more time to enable resellers to migrate from AT&T WATS to other services." CTA's words fell on deaf ears, he claimed.

Resellers claim their rapid migration from AT&T WATS to similar services offered by MCI, US Sprint and others will preserve their existence. The availability of bulk capacity services from regional fiber-optic carriers, resellers contend, will also enable them to maintain the price gap needed to compete with facilities-based carriers.

But many analysts say the reseller industry will dry up. "Reseller price margins are disappearing," according to Mayfield. "If users begin to view long-distance services as a commodity, those who simply resell AT&T services will be in trouble," he warned.

Jerry Harder, a senior consultant specializing in network design and tariffs for Nashville-based Telco Research, maintained that, "If margin pressure forces resellers to raise their rates, they will push users towards AT&T, MCI and US Sprint." AT&T is adding pressure with its recently revamped Pro America II and III discount services.

Most resellers contacted by *Network World* claimed they would rather contend with reduced profit margins than hike their prices. The majority of these companies have already begun weaning themselves from AT&T WATS service in favor of offerings from other national and regional carriers.

Said John Rosing, president of Network Telecommunications, Inc. (NETTEL), a Denver-based reseller: "We will do anything we have to in order to stay alive. We have to reduce our profit margins. We can't raise prices in the face of our competitors' price cuts, but we can't cut them because that would begin a degenerative cycle that would eventually cause the downfall of the reseller involved."

Rosing said NETTEL would consider doing business with any carrier willing to provide price breaks or discounts for NETTEL bringing large amounts of traffic onto the carrier's network.

Bob Merchant, operations manager for One Call Communications, Inc., an Indianapolis-based reseller with revenue of nearly $10 million, said the company has no choice but to reduce prices for its long-distance services.

He added the company will battle to maintain its current profit margins.

"We are looking at the National Telecommunications Network as a provider of services under fixed long-term contracts and as one that will also provide volume discounts for traffic we bring to their network," Merchant said.

NTN is a consortium of regional fiber-optic carriers building a nationwide fiber network.

HP from **page 1**

ture based on the International Standards Organization's Open Systems Interconnect model.

"This announcement places Hewlett-Packard among the computer leaders offering networking capabilities that meet the key requirements of each company site," said John A. Young, HP president and chief executive officer.

HP is deploying teams of network consultants around the world to work with customers to understand their business needs and translate those needs into and networking requirements, the company reported.

The HP X.25 private packet network consists of a family of switching nodes, asynchronous and synchronous packet assembler/disassembler devices (PAD), X.25 line concentrators and a network management system based on a HP 9000 technical workstation.

"Our standards-based X.25 network solution can integrate multiple vendor communications — including SNA — and offers the additional connectivity, cost efficiencies and network management capabilities that companies distributing information among remote functional areas require," Willem Roelandts, general manager of HP's Information Networks Group, said of the wide-area network offering.

HP-installed private X.25 networks can reduce corporate monthly communications line costs by up to 50%, depending on individual corporate requirements, the company maintained.

The network systems will range in price from $100,000 to several million dollars.

Other products expected to be unveiled include:

- The HP 2334A Plus multiplexer, a PAD that enables up to 16 devices located remotely from a computer system to access remote applications or data devices through a leased-line or X.25-based net.

The device typically provides a performance improvement of 25%, increased reliability and faster configuration as compared with the previous HP 2334A model. This device is available in four versions: the 4-port model costs $2,800; $3,650 for the 8-port version; $4,500 for the 12-port unit; and $5,350 for the 16-port unit.

- Working with the West Bridgewater, Mass.-based Connections Telecommunications, Inc., HP has developed two network design software packages. The tools are supported on the HP Vectra PC and are available from Connections.

The first of the duo of net design aids, the Distributed Network Design System, helps generate the cost-efficient X.25 networks and runs on the HP Vectra PC or the IBM Personal Computer AT with Microsoft Corp.'s Windows software. Users input information about systems, switches, throughput, desired response time and costs of a given network.

The second software package, the Multipoint Network Design System, helps generate optimized terminal-to-computer connections and runs on the HP Vectra PC or the IBM Personal Computer. It is priced at $15,000.

The new design tools enable users to perform a series of "what-ifs" and delete communications links until the X.25 network or terminal-to-system configurations are optimized for reponse time and cost. In addition, the tools provide detailed information on communications carriers and assist the user in selecting the carrier that best meets the user's network requirements. The Distributed Network Design System is priced at $10,000.

- The HP 18264A statistics software package for the HP 4952A protocol analyzer, which reportedly facilitates link troubleshooting on X.25 and IBM Systems Network Architecture-based nets. This software costs $350.
- The HP 18300A X.25 network performance analyzer, a $1,200 device that works in conjunction with the $14,150 HP 4953A protocol analyzer and enables network operators to detect network degradation before it becomes evident to users.
- HP SiteWire, a guide to multivendor wiring methods intended to provide planning, design and implementation support for wiring manufacturing, engineering and business environments. Price is by customer quote only.
- Net/One Buffered Repeater, a $3,800 device from Ungermann-Bass, Inc., used to connect HP work-area subnetworks to facilitywide broadband nets.
- HP Network Services for DEC VAX computers, programs intended to provide HP-to-DEC connectivity that list for $6,000 to $11,000, depending on the VAX model.

Wang from **page 2**

ume products such as handsets and components such as PBX interfaces. The shift in manufacturing will not lead to a reduction in the manufacturing staff in Texas, he said. Workers at Intecom's Texas facilities will continue to assemble switches and larger switch components. Intecom currently employs 925 workers.

Wang said there are no plans to reduce Intecom's direct sales force either. "A computer salesman does not have the expertise to sell a switch, just as a switch salesman does not have the needed expertise to sell a computer," Wang said. However, joint sales efforts will be stepped up, he added.

Thibault concurred. "We're keeping the Intecom sales force intact," he said. He added that collocation of the Wang and Intecom sales staffs has paid dividends, as a recent joint sales call culminated with the closing of an unspecified deal.

Wang said plans to expand Intecom's dealer network are also being discussed. Intecom equipment is currently distributed through a small direct sales force as well as through Nynex Corp., Bell Atlantic Corp., BellSouth Corp., US West, Inc. and Southwestern Bell Corp., five of the seven regional Bell holding companies.

Calendar

Jan. 20-21, Los Angeles — SYSCON/'87-West: OEM Computer Peripherals Sub-Systems Conference and Exposition. Contact: MultiDynamics, Inc., 17100 Norwalk Blvd., Suite 116, Cerritos, Calif. 90701.

Jan. 20-21, Orlando, Fla. — Understanding and Selecting Voice Messaging Systems. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Jan. 21-23, Washington, D.C. — Installing, Operating and Troubleshooting Data Communications Equipment. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

Jan. 22-23, Orlando, Fla. — Maximizing the Potential of Your Voice Messaging System. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Jan. 22-23, Arlington, Va. — BOC Regulation: 1987 and Beyond. Contact: TeleStrategies, 1355 Beverly Road, McLean, Va. 22101.

Jan. 26, Toronto — WATS Workshop '87. Contact: Angus TeleManagement Group, Inc., Suite 210, 2175 Sheppard Ave., North York, Ontario. M2J 1W7.

Jan. 28, Dallas — How to Design and Manage the Non-Stop Network. Contact: Robert Rogers, 2 Mission Park, Suite 104, 1202 Richardson Drive, Richardson, Texas 75080.

Jan. 28-30, New York — SNA Architecture and Implementation Seminar. Contact: Communications Solutions, Inc., 992 Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Jan. 29-30, Boston — X.25: Evaluating and Selecting Offerings and Options. Also, Feb. 5-6, Atlanta; Feb. 19-20, Washington, D.C.; March 2-3, Los Angeles; March 5-6, San Jose, Calif. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Jan. 29-30, Washington, D.C. — Packet Tech '87. Contact: TeleStrategies, 1355 Beverly Road, McLean, Va. 22101.

Feb. 2-4, San Francisco — Data Communications I: An Introduction to Concepts and Systems. Also, March 16-18, New York. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 2-6, Washington, D.C. — Understanding Microcomputer Data Communications: A Hands-On Approach. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

Feb. 2-6, Atlanta — ACT/VTAM for Practitioners. Contact: American Data Group, Inc., Suite 295, 1770 Indian Trail Road, Norcross, Ga. 33093.

Feb. 3-4, Orlando, Fla. — Introduction to Telecommunications Systems: Technologies and Applications. Contact: Telecommunications Series, Institute for Business and Industry, Valencia Community College, P.O. Box 3028, Orlando, Fla. 32802.

Feb. 4-6, San Francisco — Data Networks: Management, Operation and Control. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Feb. 5-6, Boston — An Intensive Introduction to T1 Networking. Also, Feb. 9-10, Atlanta; Feb. 12-13, Detroit; Feb. 19-20, Princeton, N.J. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Feb. 9-11, Atlanta — Architecture and Operation of the IBM 3275. Contact: American Data Group, Inc., Suite 295, 1770 Indian Trail Road, Norcross, Ga. 30093.

Feb. 12-13, Washington, D.C. — ISDN Summit '87. Contact: TeleStrategies, 1355 Beverly Road, McLean, Va. 22101.

Feb. 18-19, Washington, D.C. — The International Conference on Satellite Communications and Broadcasting. Contact: Rose Hill, Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Feb. 19-20, Atlanta — ISDN: The User's Intelligent Connection to Plug-in Networks and Services. Contact: Information Gatekeepers, Inc., Attn. Communications Information Institute, 214 Harvard Ave., Boston, Mass. 02134.

Feb. 19-20, New York — Local Area Networks: Connections for Improved Performance. Also, March 17-18, Chicago; March 26-27, San Francisco; April 1-2, Atlanta. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 25-27, Phoenix — Sixth Annual Phoenix Conference on Computers and Communications. Contact: Stephen Paquette, Phoenix Metro Group, Suite 900, 34 W. Monroe, Phoenix, Ariz. 95003.

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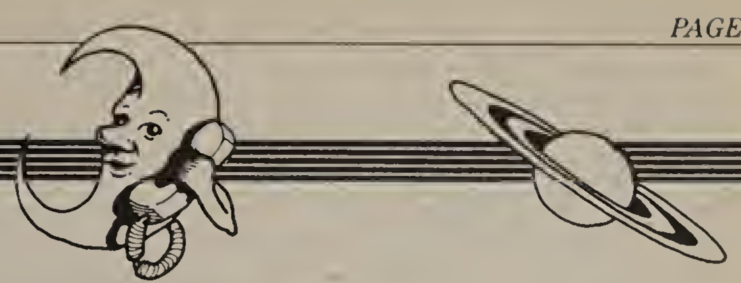
BY EDWARD HORRELL



In communications today, it takes more than just good business sense to survive; it requires celestial guidance.

Libra: The sign of the scales ordains that a new year must balance the sublime with the absurd. And so this special edition of Horrellscopes will give readers an opportunity to select the true predictions from the stars of 1987 from some that aren't so true.

Considering the events of 1986, the trick of determining which is which might be more difficult than expected.

Scorpio: The most powerful sign of the zodiac points to a revolutionary new product to be introduced by a subsidiary of Ztel Corp. and CXC Corp. The joint venture product, rumored to be named Pussywillow, is a private branch exchange that is reported to offer the capabilities of both making and receiving telephone calls.

Consultants who previewed the system question whether the market is ready for a simple, reliable and inexpensive PBX. They are claiming that users are so accustomed to complex, difficult-to-use, trouble-ridden systems that offering anything else could cause industrywide ramifications.

The project faces additional problems from the Federal Communications Commission, which is questioning whether to certify the system for connection to the public network. An FCC spokesman is quoted as saying, "A simple, easy-to-operate and maintainable telephone system flies in the face of what we are trying to do with deregulation."

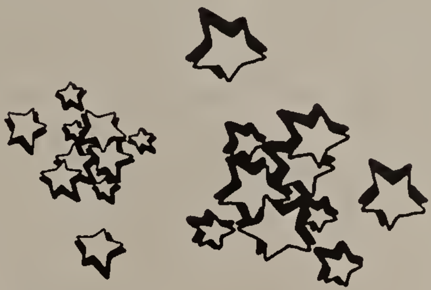
Aquarius: The water sign of murky vision greets a new idea of IBM, MGM/UA Entertainment Co. and AT&T.

Admitting a need to polish tarnished images, these three companies are prepared to give birth to another joint venture idea.

AT&T, in danger of losing its status as an innovator, and IBM, rapidly becoming known as a butcher of acquired companies, join forces with MGM, the picture people desperate to keep the movie business alive in the midst of the home-entertainment attack.

Thus, the collective wit and needs of these giants have collided to produce the Telephone-Movie Exchange (TMX). This new product is a telephone mounted on an armrest for moviegoers. Users are offered the opportunity to call someone in another row, order food or drinks from the concession area or check on the kids at home.

The TMX will also provide built-in voice mail capabilities so that calls won't be missed while users are in the restroom.



Virgo: The innocent one returns to its roots.

Sears, Roebuck and Co., that mega-planet of telecommunications, toys and trinkets, has decided to give up incidental product lines and concentrate on what it knows best.

After much controversy over its entrance into new high-tech markets, Sears decided to dedicate its corporate resources to its new No. 1 industry.

And to finance the expansion into this area, it is going to sell off its paint, clothing, shoes, hardware and furniture departments and concentrate on selling computer mainframes and large telephone systems.

A Sears spokesman said, "Sears has learned a lot from selling small telephone systems, toy telephones and personal computers. We are now ready to tackle IBM, AT&T and any other company that might want to compete with us."

The spokesman confirmed that all dentists associated with Sears would be trained in selling telephone systems and personal computers.

"Let's see IBM top that," he said.

Leo: The lion comes through with the mane idea for the new year. The award for best new idea for telephone airtime goes to a company called Phone Spots of Weston, Mo. For a modest fee, this company will put an advertisement over the rings the caller hears when he dials a firm's number.

The advertising revenue goes to the local telephone company that has paid Phone Spots for the technology and the time. As an illustration, suppose a caller with a leaky faucet phones John's Plumbing. While the waterlogged customer waits for the plumber to answer, he might hear a ring followed by a jingle or a slogan such as "The unstoppable John's Plumbing Service."

Telephone advertisements might be just the solution to getting a product before the public.

And it could be one way to lower the cost of telephone service.

Cosmic catastrophe forecast

The new year is sure to bring its share of disasters in the telecommunications industry. The stars indicate, however, that 1987 will be a banner year for foul-ups. Among the most noteworthy:

- Northern Telecom, Inc. will continue to modify its marketing program by selling more of its direct offices to distributors. The direct offices will only operate in specific major cities, such as New York, and will handle a handful of national accounts.

Also, they will announce the addition of the new vice-president of marketing, Vernon Presley, the father of the late Elvis Presley. It has been recently reported that the elder Presley also is the father of the architecture used in the SL family of products.

Presley, formerly responsible for marketing at Graceland in Memphis, Tenn., said he will bring the same philosophy to Northern Telecom that Elvis brought to the recording industry. Industry experts are applauding this bold move by the industry giant.

- IBM will announce that it was just kidding when it said it had bought Rolm Corp., and Big Blue will completely abandon the PBX market.

"What we meant to say was that we were buying Rome, Italy, for $1 billion," said a spokesman for IBM. "In the excitement, things got confused and chaos broke out. We are sorry if we caused any trouble."

Well-known consultant Walter Ulrich predicted that the Colosseum would shortly announce a major architectural change as a result of the acquisition.

- Amway Corp. of Lansing, Mich., will purchase MCI Communications Corp. Chairman Bill McGowan of MCI predicts that the offering of various soap and home items from the Amway product line will allow MCI to overtake US Sprint Communications Co. as the second major long-distance carrier.

The FCC is expected to rule this year on whether Amway will be forced to keep its long-distance subsidiary separate from its soap division or whether both subsidiaries will be allowed to market through one division. ◼

Horrell is president of Mitchell & Horrell, Inc., a telecommunications consulting firm in Memphis, Tenn.

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